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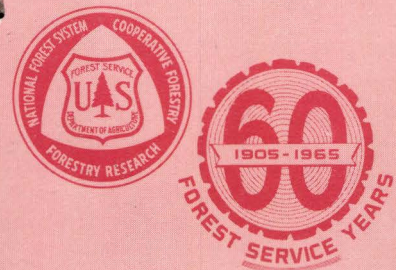
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# National Forest FIRE CONTROL

## WORKSHOP REPORT

St. Louis, Missouri

March 7-12, 1965



Forest Service

U.S. Department of Agriculture

**FIRE CONTROL WORKSHOP**

**St. Louis, Missouri**

**March 7-12, 1965**

REPORT  
FIRE CONTROL WORKSHOP  
 St. Louis, Missouri  
 March 7-12, 1965

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### SUMMARY OF MEETING

More than 50 Forest Service fire leaders from all Regions and the Washington Office met at St. Louis, March 7-12, 1965, to review the current fire control program and make plans for the next few years. Special attention was given to fire prevention, air attack, large fire management, fire danger, equipment development, finances, and training. The last similar general Fire Control Workshop was held in Santa Barbara, California, in February 1961.

Weather Bureau officials from the Washington Office and western Regions met with the group to consider the fire weather service provided to fire agencies. A new portable fire control training simulator was demonstrated to the group.

This report was prepared to record the important information presented at the conference for participants and others. Some presentations were completely written but may have been edited to make more brief but keep the essential material. Other presentations were not written in advance, and for these we have used notes taken at the meeting.

ATTENDANCE ROSTER

Region 1	E. R. DeSilvia David R. Kyle Merrill Tester J. M. Pomajevich J. Everett Sanderson Herbert K. Harris	Assistant Regional Forester, FC Assistant F. C. Staff Forest Supervisor - Flathead N.F. F. C. Staff Director, Missoula Equip. Development Center
Region 2	C. A. Yates H. P. Gaylor T. A. Schlapfer J. E. Jensen	Assistant Regional Forester, FC & S&PF F. C. Staff Forest Supervisor - Black Hills, N.F. F. C. Staff
Region 3	A. G. Brenneis C. K. Collins Raymond Housley	Assistant Regional Forester, FC & S&PF F. C. Staff Forest Supervisor - Coconino N.F.
Region 4	H. S. Coons C. B. Doll J. W. Lancaster	Assistant Regional Forester, FC & S&PF F. C. Staff Fire Weather Specialist
Region 5	Norman J. Farrell E. E. Silva R. W. Bower Jay Peterson Richard Johnson	Assistant Regional Forester, FC Director, Arcadia Equip. Development Center F. C. Staff F. C. Staff F. C. Staff
Region 6	K. O. Wilson W. C. Wood	Assistant Regional Forester, FC Fire Control Equipment
Region 7	E. L. Peltier H. C. Frayer	Fire Control Chief Fire Control Staff
Region 8	John Spring John Koen Archer Smith Fred Ames	Assistant Regional Forester - FC Forest Supervisor - Ouachita N.F. F. C. Staff F. C. Staff
Region 9	George S. James V. A. Parker W. J. Emerson Ed Young Bob Carr W. R. Tikkala	Regional Forester Assistant Regional Forester, O and FC Fire Control Chief F. C. Staff Air Officer Fire Control - S&PF
Region 10	Frank Bailey	Fire Control - S&PF

ATTENDANCE ROSTER (cont'd)

**Washington Office**

E. W. Schultz	Assoc. Deputy Chief - NFP&D
Merle S. Lowden	Director, Div. of Fire Control
Jack Barrows	Director, Forest Fire Research
Ed Ritter	Trespass, RFD - FC
John M. Pierovich	Training, Prevention, Safety - FC
Monte K. Pierce	Aeronautics, Equipment Development - FC
William R. Moore	National Fire Coordination Study - FC
Joseph W. Gorrell	Plans, Suppression, Fire Danger - FC
M. E. Hardy	Cooperative Forest Fire Prevention
John Keetch	Forest Fire Research - Asheville, N.C.
Frank Lewis	Beltsville Electronics Center

**U. S. Weather Bureau**

Lynn Means	Washington, D. C.
W. R. Krumm	Salt Lake City, Utah



. FIRE DANGER RATING AND FIRE WEATHER

A. Problems in Application of the National Fire Danger Rating System.

John Keetch

The Forest Service in cooperation with many other agencies started working on a national fire danger rating system four years ago. At that time there were eight principal fire danger systems in the United States. We studied each system and from this developed a theory for a national system.

The National System has been divided into four phases.

1. Fuel - Energy Phase. This will define the rate of energy release from a fire. Need to search out the fuel factors and how they relate to each other. No work done yet.
2. Risk Phase. This will predict how many fires will occur on an administrative unit on a given day. No work done yet.
3. Ignition Phase. This will define the probability of a firebrand starting a fire. Laboratory work is needed to define the various factors and how much weight should be given to each.
4. Spread Phase. This is the phase which has been placed into effect. Most of the existing systems have some measure of fire spread. The problem has been to properly weigh the factors that affect the forward rate of spread of a fire.

Major problems and impacts of adopting the national system are:

- a. Training weather observers to obtain uniform measurements.
- b. Personnel reluctant to accept the new system because index numbers do not agree with the former local system. This will change as we learn to interpret the new system.
- c. The location, maintenance, and operation of our weather stations is sub-standard in many locations. A definite plan for periodic review should be made.
- d. Our total station network should be reviewed periodically to see if there are stations needed or if there are more than we can realistically maintain. Seek opportunities to cooperate with other fire service agencies in developing and maintaining a network of stations.
- e. The herbaceous stage has been a source of trouble and error. Rules of thumb should be developed in cooperation with local experiment stations.

B. Adaptation in a Specific Region

J. W. Lancaster  
Region 4

1. Previous Rating System in R-4

a. Model 8 Intermountain System in use since 1956.

- (1) Burning Index -- this is a spread index.
- (2) Severity Index -- 5-day running total of 1/2" fuel stick moisture.

b. Main problem in R-4 is major differences in climate.

- (1) SW Idaho
- (2) SE Idaho - W Wyoming - NE Utah
- (3) Eastern Sierra - Most of Nevada
- (4) Southern Utah and Southern Nevada

2. Preparation for 1964 Use of National System

a. Pre-sale job on fire people of using National System done in 1963, included contacts, plus

- (1) Inventory of fire danger stations
- (2) Record inspection and inventory

b. FDR work at Northern Forest Fire Laboratory

- (1) Inventory of records.
- (2) Computer program to get work decks for NFDR System.
- (3) Ran regression analyses, to correlate.
  - (a) B.I. with T.S.I.
  - (b) Severity Index with Buildup Index

Yielded: Conversion curves in addition to work decks for further analyses.

- (4) Conversion tables
  - (a) Mountain top to other sites.
  - (b) Valley bottom to other sites
- (5) Spread tables were converted to NFDR system.

c. NFDR Analyses in R-4

- (1) Decision made to use local and national systems in 1964.
- (2) Continue use of 5 Fire Condition Classes for planning and manning.
- (3) Set up procedure -- for manning and planning.  
Local unit had option of using local or national system.
- (4) Training sessions for about 120 FS, BLM, BIA, NPS, and State men.

3. 1964 Use in R-4

- a. Reaction mostly good, confidence level high, well received over most of the Region. Easy season in Idaho helped. Transects were installed to determine herbaceous stage.
- b. Problem Areas
  - (1) Danger station categories arbitrary, not equitable due to the differences in station location and installation.
  - (2) High Fall BUI not true expression of situation.
  - (3) Administrative adjustments needed
    - (a) Herbaceous stage where no herbaceous vegetation exists.
    - (b) Scattered character of summer storms. (Will install and use data from satellite rain gages.)
    - (c) Extrapolation for elevation and exposure (Conversion tables and additional H-stage transects)
    - (d) Establishing a beginning BUI for late starting stations. (NFEL helped work out procedure.)

4. Preparation for 1965 Use

- a. Region will retain 5 Condition Classes.
- b. Further analysis and work on Frequency-Probability Curves.
  - (1) Went to R-5 Frequency-Probability analyses. Picked levels for five condition classes for R-4. (See Art Pirsko's article in Fire Control Notes of October, 1961.)
  - (2) Furnished Forests Frequency-Probability curves for TSI and BUI.

(3) Printouts also a product of the program.

- (a) Chronological listing.
- (b) High Low BUI Chrono. list
- (c) High Low TSI Chrono. list
- (d) T. SI Occurrence level listing, with cumulative totals and percents.

(4) Incorporated NFDR system in all aspects of Manning and and Specific Action regional guidelines.

5. Future Plans for NFDR System in R-4

a. Will add new indices as they are developed -- need a fire load index.

(1) Punch card library will make this relatively painless, since we will be able to use computer to analyze and draw the curves.

b. Next big step is defining fire danger rating areas. These will probably be tied to our Multiple Use Plans.

## FIRE DANGER RATING AND FIRE WEATHER (cont'd)

### C. Fire Weather Forecasting

New Organization of the U. S. Weather Bureau.      Lynn Means  
(See attached organization chart.)

The objective of the Weather Bureau in its new organization is to orient itself more toward the user and to serve him better. The Weather Bureau has increased its program from a \$4 million budget in 1940 to a \$90 million budget at present.

#### Discussion

The Weather Bureau would like to have suggestions by May 1 for any proposed changes in the National Fire Weather Plan. These are to be transmitted to the Forest Service Washington Office.

One problem -- The Weather Bureau does not have enough base stations that are able to communicate to mobile units.

Discussion brought out that there is an urgent need to standardize terms and format in fire weather forecasts. There is not agreement on how and when weather forecasts should be made. There is a real problem of communication between forecasters and fire control people because weather people have the general weather pattern in mind and fire control people have reference to local weather.

Dissemination of Weather Forecasts.      W. R. Krumm

Mr. Krumm's new headquarters address: Western Fire Weather Coordinator  
Weather Bureau Regional Office  
Box 11188, Federal Building  
Salt Lake City, Utah 84111

It is possible to send facsimile charts and voice transmission to mobile weather stations.

#### Cost of Colorado Fire Weather Teletype System - 1964.

<u>Cost to WB</u> -- Line charges	\$2040 per mo.
5 WB machines @ \$100	<u>500 per mo.</u>
	\$2540 per mo.

#### Cost to Cooperators

USFS - 6 - 6 machines @ \$30/mo	\$180
BLM - 1	30
NPS - 1	30
Colo.St. - 1	<u>30</u>
	\$270
	<u>270 per mo.</u>
Total cost for circuit and machines -	\$2810 per mo.
Paper and ribbons (estimated)	<u>190 per mo.</u>
Total cost per month	\$3000

Recommended for 1965 - 5 months  
of operation (June 1 - October 31) --- \$15,000/season.

CHIEF  
OF  
BUREAU

Executive Office

CHIEF SCIENTIST

METEOROLOGICAL  
RESEARCH

Air Resources Lab.  
Atmospheric Analysis  
Lab.  
Atmospheric Physics &  
Chemistry Lab.  
Geophysical Fluid  
Dynamics Lab.  
Sea-Air Interaction Lab.

CLIMATOLOGY

Field & User Services  
Laboratory of  
Climatology

HYDROLOGY

Hydrologic Services  
Water Management  
Information  
Hydrologic Research &  
Development Lab.

INTERNATIONAL  
AFFAIRS

PUBLIC  
INFORMATION

POLICY  
PLANNING

AVIATION  
WEATHER AFFAIRS

NATIONAL  
WEATHER SATELLITE  
CENTER

Meteorological Satellite  
Lab.  
TOS System Engineering  
Operations

ADMINISTRATION  
AND TECHNICAL  
SERVICES

Administrative  
Operations  
Budget and Accounting  
Facilities and  
Maintenance  
Management and  
Organization  
Personnel  
Scientific Documentation  
(Includes Library)

NATIONAL  
METEOROLOGICAL  
SERVICES

SYSTEMS  
DEVELOPMENT

Equipment Development  
Lab.  
Systems Design Team  
Techniques Development  
Lab.  
Test and Evaluation  
Lab.

Data Acquisition

Weather Analysis &  
Prediction

Communications

Systems Control

DEPUTY  
DIRECTOR  
FOR  
OPERATIONS

DEPUTY  
DIRECTOR  
FOR SERVICE  
PROGRAMS

USER SERVICES  
REPRESENTATIVES

Public  
Agriculture  
Aviation  
Fire Weather  
Marine  
Military

NATIONAL  
METEOROLOGICAL  
CENTER

Analysis & Forecast  
Computation  
Development  
Extended Forecast

REGION I  
New York

Operations  
Administration and Technical  
Services  
Regional Meteorologist  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative

State Coordinators

FIELD OFFICES

=====

REGION II  
Ft. Worth

Operations  
Administration and Technical  
Services  
Regional Meteorologist  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative

State Coordinators

FIELD OFFICES

=====

REGION III  
Kansas City

Operations  
Administration and Technical  
Services  
Regional Meteorologist  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative

State Coordinators

FIELD OFFICES

=====

REGION IV  
Salt Lake City

Operations  
Administration and Technical  
Services  
Regional Meteorologist  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative

State Coordinators

FIELD OFFICES

=====

REGION V  
Anchorage

Operations  
Administration and Technical  
Services  
Regional Meteorologist/  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative/  
State Coordinator

FIELD OFFICES

=====

REGION VI  
Honolulu

Operations  
Administration and Technical  
Services  
Regional Meteorologist/  
Scientific Services  
Regional Climatologist  
Regional Hydrologist

Regional User Services  
Representative/  
State Coordinator

FIELD OFFICES

=====

Atmospheric Turbulence  
& Diffusion Lab.  
(Oak Ridge, Tenn.)

Research Flight Facility  
(Miami, Fla.)

National Hurricane  
Research Lab.  
(Miami, Fla.)

National Severe Storms  
Lab.  
(Norman, Okla.)

National Weather  
Records Center  
(Asheville, N. C.)

## FIRE DANGER RATING AND FIRE WEATHER (cont'd)

### D. Use of Fire Weather Information to Aid in Prevention, Preparation For, and the Suppression of Wild Fires.

G. B. Doll

The use of fire weather information is becoming more and more important as a basic tool for directing actions of a fire organization. The value of accurate fire weather forecasts have become increasingly important to fire control administrators...Not only in directing suppression actions, but as a guide to pre-planned actions and manning levels to assure timely completion of fire prevention and suppression jobs.

Let's first consider the kinds of weather forecasts we have been receiving from the U.S. Weather Bureau:

1. GENERAL AREA FORECASTS - These are daily fire weather forecasts usually provided to the forest by about 4 p.m.
2. FIVE-DAY FORECASTS - These are provided upon request and are primarily useful in planning for long weekends and holidays. They are also useful when project or other fire suppression loads are confronting a dispatcher. They are less accurate, and should be followed up with changes when later forecasts may reflect changes.
3. SPOT WEATHER FORECASTS - These are localized forecasts made on request that are needed for a specific fire or burning job. The request may be made following WB-Form 653-1 to give the fire weather forecaster basic local information upon which to judge and base his FIRE SPOT FORECAST. (See Sample Form on page 10).
4. EMERGENCY WARNINGS - Issued by the Fire Weather Forecaster when a period of unusually severe weather is forecast. In R-4, these are headed "Red - Flagged" forecasts. This title is continued in all future forecasts as long as the critical conditions continue (i.e. Winds of 25 pmh and/or 10% RH).

It should be emphasized that red flagged forecasts will be based on weather conditions and not on fire behavior. In R-4, we have agreed that red flagging will not be used by the forecaster to reflect the likelihood of LIGHTNING OR THUNDERSTORMS. These are handled as a specific item in the General Area Forecasts, giving the percent probability of lightning.

# FIRE WEATHER SPECIAL FORECAST REQUEST

U.S. DEPARTMENT OF COMMERCE  
WEATHER BUREAU

(See reverse for instructions)

## I - REQUESTING AGENCY WILL FURNISH:

1. NAME OF FIRE OR OTHER PROJECT		2. CONTROL AGENCY		3. REQUEST MADE	
				TIME #	DATE
4. LOCATION (By 1/4 Sec - Sec - Twp - Range)		5. DRAINAGE NAME		6. EXPOSURE (NE, E, SE, etc.)	
7. SIZE OF PROJECT (Acres)*		8. ELEVATION*		9. FUEL TYPE	
		TOP		BOTTOM	
				10. PROJECT ON: <input type="checkbox"/> GROUND <input type="checkbox"/> CROWNING	

## 11. WEATHER CONDITIONS AT PROJECT OR FROM NEARBY STATIONS (See example on reverse)

PLACE	ELE- VATION	OB TIME#	WIND DIR.-VEL.	TEMP.		↑ (Lv. Blank)		REMARKS (Indicate rain, thunderstorms, etc. Also wind condition and 10ths of cloud cover.)
				DRY	WET	RH	DP	
12. SEND FORECAST TO:			PLACE			VIA		ATTN: (Name, if applicable)

## II - FIRE WEATHER FORECASTER WILL FURNISH:

### 13. FORECAST AND OUTLOOK

TIME # AND DATE: \_\_\_\_\_

NAME OF FIRE WEATHER FORECASTER

FIRE WEATHER OFFICE

## III - REQUESTING AGENCY WILL COMPLETE UPON RECEIPT OF FORECAST

IV. FORECAST RECEIVED:	TIME #	DATE	NAME
------------------------	--------	------	------

Explanation  
of  
symbols:

- \* Use 24-hour clock to indicate time. Example: 10:15 p.m. = 2215; 10:15 a.m. = 1015.
- \* For concentrations (as groups of lightning fires) specify "Concentration"; then give number of fires and size of largest. If concentrations are in more than one drainage, request special forecast for each drainage.
- † No entry necessary. To be computed by the Fire Weather Forecaster.



## INSTRUCTIONS

### I - Fire Control and other Project Personnel:

1. Complete all items in Section I each time a special forecast is desired.

#### a. Example of Weather Conditions:

PLACE	ELE- VATION	OB TIME	WIND DIR.-VEL.	TEMP.		†(Lv. Blank)		REMARKS
				DRY	WET	RH	DP	
Fire camp	2080'	1125	NW 16	85	62			Scattered clouds, 2/10ths Cumulus. Thunderstorm ended 2 hours ago. Wind gusty, direction varies from NW to N.

2. Transmit in numerical sequence to the appropriate Fire Weather Office. (The Fire Weather Forecaster will complete the special forecast as quickly as possible and transmit the forecast and outlook to you by the method requested.)
  3. Upon receipt of special forecast, complete Sections II and III.
  4. Retain completed copy of form for your records.
  5. Should conditions occur that are not correctly forecast, notify the Fire Weather Forecaster by phone or radio.
- II. **ALL RELAY POINTS** should use this form to ensure completeness of data and completeness of the forecast. A supply of the form should be kept by each dispatcher and all others who may be relaying requests for forecast or who may be relaying the forecast.
- III. Forms are available from your local Weather Bureau Fire Weather Office. They may also be reproduced by forest or range agencies as needed, entering the phone number and radio identification, if desired.

### IV. Fire Weather Forecasters:

1. Copy information received on this form.
2. Complete special forecast as quickly as possible and return forecast and outlook by the method requested.
3. Supply pertinent radar scope information whenever possible, indicating time of radar report.
4. Complete "RH/DP" columns in Item eleven.
5. Retain copy for record purposes.

THE LOCATION OF THE FIRE DANGER STATION is very important. It is best if located to provide weather data at the site where records indicate the greatest % of ignitions have occurred in the past, such as:

- (1) in man-caused occurrence zones.
- (2) or in lightning risk fire belts.
- (3) It is also important to relate the fire weather to areas in higher resource value classes and to other current risk and hazard areas.

Where it is not practical to take fire weather near the site of the problem areas, it may be related to the SPREAD INDEX from a local weather station by use of the SPREAD INDEX CONVERTING TABLES.

- (1) From Valley Bottom Stations - Table A
- (2) From Mountain Top Stations - Table B

#### DAILY FIRE DANGER RECORD -

This is a visual graph record which permits a ready comparison of the current fire danger with past records. It can be used to compare either the "SPREAD OR BUILDUP" indexes with past seasons' highs and lows for any day during the fire season. This guide provides a valuable tool to increase the accuracy of predictions of fire behavior as related to a forest or district condition. It is also a form where (1) a record of lightning occurrence dates, and (2) fires occurring, by number and size class may be recorded and compared as to fire weather (danger) on the same date.

One problem is evident if "buildup-index" as now computed is used as a guide to fire danger rating, as it tends to over-rate the fire danger in the fall season. This may be corrected when an ignition index is added if the resulting index reflects the influence of the shorter burning period and higher humidities during late fall days and provides a "fuel recovery rating" based on other than precipitation.

IN SUMMARY, fire weather information is important:

#### IN FIRE PREVENTION-

- (1) To assure timely completion of the program.
- (2) As a basis for public warnings and need for restrictions.
- (3) For activation of and cancellation of "closures".

#### IN PRESUPPRESSION-

- (1) To be used as guides for manning and specific action plans.
- (2) For estimating the fire occurrence load in high risk areas.

#### IN SUPPRESSION-

- (1) For calculation of rate of fire spread to aid in the calculation of initial attack strength.
- (2) To help guide followup manning actions for extra-period and project fires.
- (3) To help plan the safety program when unusual fire behavior is expected.

**OTHER**

- (1) To evaluate relative success of programs.
- (2) To help evaluate the relative severity of fire seasons.
- (3) For planning and conducting prescribed burns.

## PERSONNEL CONSIDERATIONS FOR FIRE CONTROL

### A. Fire Control Career Ladders

N. J. Farrell, W. R. Moore, R. Johnson

The evolution of Fire Control Training Guides and of Personnel Management Employee Development Guides was discussed. Present omissions, and needed coordination with overall employee development were covered.

A Fire Control Training Task Force Report covered proposed Fire Functional Training revisions, and additions to FSM 6141.2 was related to this discussion. Proposals include the following primary items:

#### 1. Career Field Charts

##### a. Aids and Technicians - 456 Series

- (1) Format changed to match 460 Series
- (2) New positions provided in GS-6 Tank Truck Operator; GS-11 and 12 Forest Fire Control Officer; GS-6, 11, 12 Prevention Specialist; GS-12 dispatcher (to be called Coordinator)
- (3) Showing as typical and desirable greater flexibility for specialization shifts, particularly for smokejumpers.

##### b. Aircraft Operations - 2181 Series; a gap filled here by proposing a career field chart, based upon positions now actually filled.

##### c. Criminal Investigator - 1811 Series; as with the air series, a gap exists that is proposed to be filled, recognizing both fire control's large stake in these personnel and the need for this series to be closely coordinated with other functional work. This latter recognition includes awareness that this series may ultimately be shown in a category apart from fire control.

#### 2. Career Guides by Working Titles - New for all.

#### 3. Management Training Guides for Air and Investigator Series.

#### 4. Technical Training Guides for all Fire Specialists.

#### 5. Newly described functional fire courses.

### Discussion

General acceptance of Task Force Proposals was apparent. Questions raised which indicate possible W.O. follow-up include:

1. Provision for additional emphasis on Helicopter/Helitack Training.
2. Provision for GS-7 and 9 Aerial Observers in view of electronic detection.
3. Provision for such fire control specialists as those who are assigned to equipment development.

## B. Fire Function and Employee Development

F. Bailey and J. E. Sanderson

Providing initial and maintenance fire control training for "generalist" and other functional personnel was discussed in terms of dependence upon them in campaign fires and their needs for fire-related management decisions. The Training Task Force Report proposed incorporation of this in fire control functional training guides identified as applicable to these categories of personnel. Professional and technician groups were proposed for selected fire courses, from among those described for fire specialists. These included general fire knowledge and specialized training related to fire overhead positions to which these personnel are assigned. Revision to FSH 5125.4 to delete materials now to be incorporated in the Employee Training and Development Handbook, FSH 6141.2, and to provide more specifically for Fire Overhead Training.

### Discussion

1. Task Force Professional Training Guide appears to be most closely related to Line (Ranger-Supervisor) needs. Additional abbreviation should be considered for other specialist personnel.
2. Survey Courses, cross-referenced to portions of other specialist courses may be preferred, using titles such as "Firemanship #1," etc.
3. The Fire Training Guides for each career field series might better be keyed within their general or other-function listing in each group instead of separately in fire control functional training.

## C. Safety Procedures and Practices

J. M. Pomajevich, E. Young, J. M. Pierovich

Presentations were developed around an identification of problems underlying fire control and air operations safety programs. Communication, and management through communication, were keyed as areas where the most gains could be made. Communication breaks down between individuals because of varied experience, poor listening, poor presentation, and too much volume. The same is true between organizational levels. Examples of how these affect communication are found in almost everything a crewman or a contract pilot is expected to do safely on fires. More gains can be made in the fire and air safety programs through improved communication; communication of principles (general knowledge), and communication of directions (directives materials and orders).

The investigation of accidents was related to this communication process as "feed-back," "feed-back" in terms of reporting circumstances of accidents and in terms of drawing tangible recommendations. Recommendations are made

in "should-do" language and must be realistic in order that Management may convert these to "shall-do" actions. Air accident prevention and investigation courses, such as the University of Southern California course, were reviewed and used as a basis for suggestions to improve accident investigation and reporting.

Concepts of idea communication and information programing were discussed with examples of difficult interpretation found in the Directives System. Ideas are best exchanged between employer and employee when the employee has a chance to show what he thinks is expected of him. In this way, the boss makes sure his direction, information, etc. is understood the way he intends it. Information programing serves this purpose. It also serves to give the receiver of information some practice in using the ideas, making it more natural for him to apply them later when needed. In a simple linear control example, information programing is the logical presentation of instructions to a crewman, then having him tell what these instructions will have him doing. (The Ten Standard Firefighting Orders tell us to be sure our orders are understood.)

As a more complex example, "The Ten Standard Firefighting Orders" themselves do not get communicated simply by requiring that they be memorized. Men must work with them; they must tell how the Orders apply. Men must learn to identify with each Order.

Identity with an idea is an essential step in making the idea stick. If we work at making Directives Material identify with the people for whom they are intended, safety communication will become more a process of making ideas return to the surface when needed.

The identification and programing processes may be given a boost by the use of a continuing theme. Fire safety could use "The Ten Standard Firefighting Orders" as a central theme and as subordinate themes. Subordinate theme examples were illustrated by the first three Orders. These Orders can be used to introduce segments of fire behavior training and as points of reference for instructions on actual suppression assignments.

In summation, each line and staff officer must work to improve fire and air operation safety communication. He can do this by programing his information to get "feed-back" and to get action responses. Themes such as might be built around "The Ten Standard Firefighting Orders," can help to bring about personal identification, thus receptiveness by individuals.

### Discussion

1. Individual and Supervisor's responsibility as a possible additional Them for Safety.
2. Specially arranged training for selected air personnel in Air Accident Investigation.
3. Development and use of accident investigation check lists to help investigators identify causes.

## AIR OPERATION AND FIRE EQUIPMENT

### A. Management of Air Operations

#### 1. Organization and Supervision Responsibilities

E. R. DeSilvia

#### Regional Office - Division of Fire Control Branch Chief - Air Operations

1. In conjunction with Administrative Services Branch, prepares all Service contracts.

Specifications and requirements are determined by:

- a.. Needs of Forest or project.
- b. FAA and CAB regulations.
- c. Standards established for Forest Service and Region.

2. Prepares rental survey agreements.

3. Assigns qualified personnel from the Branch to inspect all aircraft and to qualify pilots.

Local Forest officers make final arrangements.

4. Assigns aircraft from Service-wide contracts to Forests, Divisions, and projects, such as:

- |                                                    |   |              |
|----------------------------------------------------|---|--------------|
| a. Fire                                            | ) |              |
| b. Insects                                         | ) | Responsible  |
| c. Disease                                         | ) | for accurate |
| d. Sagebrush eradication                           | ) | calibration  |
| e. Wildlife habitat improvement                    | ) | of spray     |
| f. Flood control                                   | ) | aircraft     |
| g. Back-country bridge and<br>lookout construction |   |              |
| h. Engineering surveys and mapping                 |   |              |

5. Sets up air safety programs for foregoing projects. Usually provides air operations man and air safety officer from Branch.
6. Arranges for inter- and intra-Region air transportation of personnel, supplies, and equipment.
7. Develops policies and procedures and activates a Regional air safety program with continuing followup inspection. Implements Washington Office requirements.
8. Develops policies, procedures, and organizes Regional smokejumper program.

9. Supervises Forest Service pilots and aircraft use and evaluates the effectiveness of each.
10. Prepares plans for Regional retardant plant dispersal, plant layout and organization.
11. Plans, evaluates, and executes retardant pilot training.
12. Plans and arranges for aircraft needs in excess of normal requirements.
13. Develops criteria for construction and maintenance of airports to meet Service needs and aircraft capabilities.
14. Trains Forest air officers in aircraft inspection standards.
15. Plans and conducts administrative studies in air operation.
16. Represents Regional Forester and Division Chief at air operations meetings. Makes General Functional Fire Inspections. Participates in Regional General Integrating Inspection as member of 2-man team.

Forest Supervisor - Staff  
Fire Control

1. Determines local aircraft needs and requests the services required from the Regional Air Officer. Services furnished may be by contract to be administered by the Forest, or may be by assignment of aircraft from other areas.
2. Requests services of Regional Air Operations to resolve specialized and technical problems of air operations.
3. Prepares and supervises air-ground detection plan.
4. Constantly evaluates performance of aircraft operators in his area and keeps Regional Air Officer informed.
5. Supervises air operations on his Forest.
6. Prepares Forest air safety program and implements Regional requirements.
7. Plans helicopter retardant safety training for Forest temporary personnel.
8. Requests special services, such as: smokejumping, air cargo, retardant, and helicopters from Regional Air Officer.



9. Coordinates Ranger Districts' planned schedule of air services.
10. Assists Regional Office in developing criteria for construction and maintenance of airports to meet Service needs and aircraft capabilities.
11. Unilateral decisions to change the pattern of air operations organization are unacceptable as they may create unsafe situations and unduly confuse the various levels of the air activity.

#### Ranger District - District Ranger

1. Determines aircraft needs for the District and submits plan to Forest Supervisor.
2. Administers air operations on his District.
3. Prepares and implements regular and special air-ground detection plan.
4. Prepares project air safety plan. Implements Forest and Regional air safety requirements and training-- helicopter and retardant.
5. Requests special air services, such as: smokejumpers, air cargo, retardant, and helicopters from Forest Supervisor.
6. Prepares schedule for air services.
7. Obtains evaluations on effectiveness of air operations taking place on his District or fire.
8. Unilateral decisions to change the pattern of air operations organization are unacceptable as they may create unsafe situations and unduly confuse the various levels of the air activity.

#### Pilots

1. Pilots operate Government-owned aircraft as assigned by Regional Air Officer or Chief Pilot.
2. Inspects aircraft for contract requirements and schedules follow-up checks.
3. Makes operational checks and participates in training of contract pilots.

4. Checks and evaluates qualifications of all pilots and effectiveness of various aircraft.
5. Advises Regional Air Officer on all specialized and technical problems involving air operations.
6. Assists R.O. Branch Chief in charge of air operations to develop criteria for construction and maintenance of airports to meet Service needs and aircraft capabilities.
7. Assists Regional Forester and District Rangers in air safety programs (fixed-wing and helicopter).
8. Assists Regional Air Officer in training retardant pilots in fire control activity, organization, etc.
9. Maintains Government-owned aircraft.
10. When on fire assignment as lead plane pilot, is responsible to Fire Boss through the Air Attack Boss.
11. Pilot participates in landing fields safety inspection, planning, and maintenance.
12. Unilateral decision concerning the need for various air activity is not the prerogative of the pilot. The pilot's area of decision lies in determining to fly or not to fly; or to make the drop or not to drop, depending on his personal view of the safety potential involved.
13. Unilateral decision in the area of air operations organization is also unacceptable.

## 2. Enforcement of FS Operation Requirements

Monte K. Pierce

The American College Dictionary defines ENFORCE as keep in force, compel obedience, impose upon a person, support (a demand by force), to impress or urge forcibly, lay stress upon. Enforcement is the act or process of enforcing.

Enforce also means to compel, oblige, urge, goad, strengthen, execute, sanction, put in force, or seek compulsion. These are methods we can use to enforce.

Going on further for REQUIREMENTS, we find it is that which is required. A thing demanded, the act for and instance of requiring, a need.

At the Marana Air Operations School we used the problem-solving procedure. With that process I have determined that a problem exists, otherwise why assign this subject? We need better enforcement of our requirements. Our objective now should be to improve efficiency, safety, and cost effectiveness by solving some of our enforcement problems.

Before going into the specific problems, I offer as a simple single solution, BETTER ORGANIZATIONAL CONTROL. If we had proper organization, proper control, we should have proper results.

### Enforcement Problems

We all have these problems. The question of how to find them has two schools of thought. First, let your boss point them out to you - this is the hard way; or second, the process of elimination.

#### 1. Organization

Specifically in the Fire Organization we need to take a look at some of the positions, qualifications and the workload of the present organization. For example, the Air Officer is under the Service Chief and performs a service function, rather than an operational function. Under the present set-up his authority does not go farther than the immediate vicinity of the service airport or heliport. From that point on to and

over the fire other positions may be needed, such as the Traffic Manager. Are additional qualifications required of a dispatcher, and is the present Air Attack Boss position covering too many diversified responsibilities and duties to efficiently enforce Forest Service requirements? How can Air Attack Boss control everything in the air from airport and return? We should relieve him of some responsibility and reopen it. I don't believe that we are exercising sufficient immediate enforcement of our requirements in the fire air operations. Specifically, the workload for the air attack boss is too heavy.

Suggested solutions are:

- a. Add previously recommended Air Chief Position to the fire boss staff.
- b. Use of Traffic Manager or similar positions to relieve air attack boss of some of the workload.

2. Cooperative Activities

This should be the mutual acceptance of the same standards for operation. At the present time we may use persons and equipment that do not meet Forest Service requirements, but are hired or employed by a cooperator. When we get into a cooperative project, then the person or equipment is in effect working for us. If we are to permit this, why should we have any standards or requirements. For example, an air tanker airplane did not meet contractual requirements for our use. However, a cooperator put it under contract. Later that season, we used it on a fire and it crashed. We are in the position of saying the aircraft did not meet our requirements, but we are still using it.

I believe we are too inclined to use the word "inspection" in trying to enforce our requirements in cooperative activities. This is often times considered a nasty word by the cooperator and does not win friends and influence people. Possibly we should concentrate more on using the operational procedure of comparing requirements to obtain mutual acceptance of a set of common requirements. Our regulations are not written in cement and reasonable changes are possible.

A possible solution is:- Strengthen and emphasize the need for common requirements in cooperative activities through mutual acceptance and training for such operations.

### 3. Knowledge of Requirements - By

#### a. Contractors

Frequently contractors, and we mean all persons that provide us services from commercial aviation sources, are not sufficiently familiar with our requirements. A couple of years ago a supplemental airline testified at a hearing after it had gotten into trouble with the CAB that they thought the Forest Service Special Regulation 397 permitted the airline, while working for the Forest Service to deviate from any and all Federal Aviation Regulations.

This, of course, is not true. Air tanker operators have used this same Special Regulation for deviation from Federal Aviation Regulations while they were operating for other agencies, States, or even private associations or firms.

The FAA has recognized the need to enforce their regulations in this regard, but have not been forcibly going after the violators I have just mentioned. But they plan to do so in the future. They are planning now to issue exemptions to agencies and States where needed for specific deviations.

A possible solution is: - Publish an Aviation Operators' Guide or Handbook.

### 4. Knowledgeable Control

More use should be made of knowledgeable control to provide needed enforcement of our requirements. For example, we may be too willing to pass responsibility on to the pilot by following through on the saying that it is the pilot's responsibility to see that the operation is proper. This frequently places much pressure on a pilot, both from us and from his boss in making a decision and shouldering responsibility for such a decision that rightfully should be made by management. For example, the helicopter accidents for the last few years have indicated a strong tendency for marginal operation. They indicate our operations are being conducted with little or no margin for mechanical mal-function or human error. The slightest incident which should not have been important under this type of operation often results in an accident. They are not always fatal, but they could be. My presentations the last three years to Helicopter Association of America have included this subject.

Suggested solutions are:

- a. Increased supervision or enforcement by our airmen during actual air operations. We have a good reservoir of aviation knowledge in our airmen, most of which is not used during our air operations. Why? Primarily because these men are performing pilot duties, rather than duties which may be more important, such as air officers. It is very difficult to perform much satisfactory air officer work while concentrating on piloting an aircraft. In our operations, safe and efficient piloting is often the maximum responsibility that can be safely or efficiently performed at one time. We should use the available air operation knowledge whenever possible.
- b. Place greater emphasis, including time, money and personnel on training and supervision of both our personnel and those of the commercial operators, and relieving pilots of the responsibility of having to make what would seemingly should be management decisions.

#### SUMMARY

Of general importance is a factor which requires additional understanding and cooperation within the Service. This pertains to those few Forest Service employees who still ask, --Why do we need all these requirements? Why don't we just go by what the FAA has set forth in their regulations? The reason is: - Forest Service air operations require a much higher standard of capabilities, both from the airplane and the pilot, than the bare minimum for licensing as set forth in the FAA standards. Greater emphasis on orientation and training of our own personnel is indicated. Adequate working knowledge of any air operation is necessary for safe, efficient management and effective results.

## AIR OPERATION AND FIRE EQUIPMENT (cont'd)

### B. EQUIPMENT USE AND DEVELOPMENT

#### a. Arcadia EDC - E.E. Silva

The new facility at San Dimas will allow the Center to perform higher quality and a greater variety of engineering tests on fire equipment. They expect to move into the new quarters before July 1, 1965. Major projects currently under way at Arcadia are:

Servicewide Standardized Slip-on Tankers. The new 50-gallon slip-on tanker will be 47 inches wide, and will fit all light truck beds. It will have an ECO pump mounted sidewise to facilitate draining the system during cold weather. All controls and valves are arranged at a single place to make one-man operation convenient.

A 200-gallon Service-wide standard slip-on tanker unit is now being constructed and is expected to be ready for performance tests sometime this fall.

The Center has developed low cost, lightweight, plywood packboards for carrying and laying fire hose. Lightweight couplings and fittings are being tested and will be included in the lightweight hose pack outfit.

The use of chemical mixing accessories for fire truck tankers has been steadily increasing. There are several chemical demand mix units developed at Arcadia being used by the State of California and the Forest Service.

Portable Pumpers. Arcadia has a steady job of testing new pumpers for forest fire control. There are several new, promising, lightweight centrifugal pumpers on the market that have passed Forest Service qualification tests. These will be reported to the field as testing is completed. The flyweight Paradox pumper weighs eight pounds and can deliver 11 gpm at 30 p.s.i. The manufacturer has recently installed a suction primer and other improvements.

#### Retardant Testing and Corrosion.

The results of corrosion studies conducted at Arcadia over the past year have been reported in EQUIP TIPS. Brass and magnesium are two of the most susceptible metals. Mild steel has shown no appreciable corrosion after three years of field tests with all common fire retardants. AEDC will continue to monitor the corrosive effects of new retardants as they are submitted for Forest Service qualification tests.

Nozzles and Fittings. Studies of the various fire nozzles are under way. Certain nozzles can be damaged or plugged by corrosion and abrasion from certain fire retardants. The Center hopes to be able to recommend best types of nozzles for use with specific chemicals.

#### Brush Cutter

One of the most promising developments under way at present is the McCullough Rotating Bit Brush Cutter. This is a McCullough chain saw engine with a 4½-foot power shaft which terminates with a wedge shaped jaw. The rotating bit cuts brush stems up to 6 inches in one or two seconds. The unit weighs 25 pounds and has a quick release harness. Three prototype brush cutters are being field tested. Results to date have been favorable. Current plans are to purchase several more to accelerate field testing during 1965.

#### Measuring Air-Dropped Retardant Patterns

Working with a private development firm, Arcadia has recently completed tests of a new retardant swath-measuring system. The system uses nitrous oxide gas mixed in retardant slurries. The amount of gas is detected electronically with an infra-red sensing device mounted on a light pickup truck. As the sensing device is driven parallel and across the retardant swath, an automatic printout of the swath pattern indicates density of the retardant. This new method will give more reliable measurements than the grid cup method. A chemical drop pattern can be mapped in a matter of minutes, whereas the cup method requires several hours.



b. Missoula EDC - H. K. Harris

The development program at Missoula Equipment Development Center has more than doubled over the past 4 years. Quality of engineering development tests is much improved. Increased capability is due largely to recruitment of additional trained test engineers. Major projects at MECD are:

The Forest Fire Shelter.

The present design offers greater protection against flash fires than any previous protective device available to forest fire fighters. Recent tests have shown the shelter can be further improved. Improved reflective materials are being evaluated. The plan is to complete the project this fall and prepare a final specification so new shelters will be available for the 1966 fire season.

Firefighting Accessories for Helicopters.

Much progress has been made in development of accessories for light helicopters. Some of these are rescue litters adaptable to all small 'copters, medical rescue kits, portable lightweight landing ramps, heavy duty wood landing ramps for primary heliports, a telephone wire laying outfit (used successfully on Coyote Fire, Los Padres NF, California 1964), and a string-lay to mark the route to hard-to-find fires.

Night Helicopter Operations.

The development of techniques and equipment for operating helicopters on fires at night has been most encouraging. The selection of expert pilots, knowledge of the area and routes (daylight reconnaissance) and reliable helicopter night landing lights are required. A special kit containing battery powered blinkers and lights for marking routes and landing spots has been developed. Limited operational tests are planned for the 1965 fire season.

Fire Camp Equipment.

A moduled palletized lightweight 50-man spike fire camp outfit containing a mess unit, camp unit, shower unit (heated water with 4 showers and wash stand), bed unit, and subsistence unit will be field tested. The outfit can be carried in three helicopter sling loads.

### Rations.

New lightweight quick-serve dehydrated fire camp and fire-line lunches are being tested. The standard GSA emergency field ration menu has been improved. Food bundles and other fire cargo properly protected with honeycomb paper and fiber cartons can be free dropped from hovering helicopters.

### Fireline Trenchers.

The one-man flail trencher has been in field use for two years and has shown greatly increased productivity when operated by trained personnel.

### Air Operations.

Lead plane pilot fatigue is being studied. Tests conducted in cooperation with FAA Civil Aeronautical Research Institute have confirmed that prolonged flight duty repeated day after day will reduce pilot's mental and physical response to marginal levels. The plan for 1965 is to measure pilots' fatigue levels on going fires. The energy levels required to do certain fire fighting jobs will be measured and used as a basis for studies concerning fire control personnel recruitment and management.

### Safety Equipment.

A project to develop and test safety items is showing results. Prototype protective chaps for chain-saw operators prevented 6 serious leg injuries during field trials in Region One. Respirators for smoke and dust, hard hats, and foot and skin protection for axemen are being developed.

### Mobile Lookout Trailer.

Several mobile lookouts (trailer) are in use in three western Regions. Improvements will be made and a final specification submitted this fall.

### c. Beltsville Electronics Center - Frank Lewis

The development, testing, and qualification of electronic equipment, such as flashlights, lanterns, special illumination equipment, batteries, weather instruments, detection devices, and communication devices is a major activity at BEC.

## CURRENT PROJECTS:

### 1. #825 - Automatic Fire Weather Telemetry.

Field tests of Mark I systems were completed during 1963 and 1964 on the George Washington National Forest (R-7) and Gifford Pinchot National Forest (R-6). Final modifications to these two prototype systems are underway currently to make them available to the respective regions as operational equipment if they so desire.

Lab tests and modification of Mark II system completed. A simulated field test is underway at Beltsville currently.

Interim Specifications for operational systems have been completed. Preparation of an operations manual is in progress and should be available by the time any systems on order are delivered.

Weather sensors, as part of this telemetry system, have been developed and/or tested by BEC and commercial services established as necessary (e.g. Tipping Bucket Rain Gauge, Ten Minute Anemometer, etc.). Wind Tunnel tests on the anemometer have recently been completed at the Bureau of Standards for BEC. The Western Fire and Equipment Co. commercial models of the anemometer have recently been tested and evaluated at BEC.

A mechanical wind counter has also been developed at BEC and test models have recently been sent to the field for tests. This device will permit remoting of land line anemometers up to one or two miles from the observer's location if necessary. It is understood the Stewart Instrument Co. of Massachusetts is developing an electronic counting device for the same general purpose which supposedly would be competitive - \$50.00 per unit.

### 2. #827 - Heat Detection Probe.

A modified design of the Beltsville Model I, using both an **infra red detector** element for scanning and a shielded thermistor for probing suspected "hot spots", is being prepared. Hopefully field tests will be completed in 1965.

An IR scanner has been submitted by the Williamson Development Co., West Concord, Massachusetts, for evaluation. This is supposed to be an improved version of their Model No. 1200 on which tests were run and a report prepared 6/12/64.

Another IR scanning device called the "Metascope" has recently come to our attention. A model has been obtained for evaluation from the Control Science Corp., Alexandria, Virginia.

**The device is being produced for the Army under a contract calling for 2,500 units at \$269.00 each. A modified version may have application toward improving night sight for fire finders.**

The Army has another more expensive and elaborate IR system which it is hoped can be checked out soon for possible application to fire detection. The device, which comes in three basic models, one of which allegedly fits on a rifle, is called the "Image Intensifier Scope" or "Small Starlight Scope."

3. # 1242 - Fire Control Simulators.

Mark I system still in use; currently in the southwest. Planned modifications to motion mechanisms are to be completed soon.

The mobile unit (Mark II) under contract by ITT is still not completed.

An operations manual is to be furnished by the contractors (ITT and DSI) as part of their contracts. These are expected to be available upon completion of the equipment being supplied. Training guides for use of simulators are to be revised and issued in manual form during the current year, if possible.

4. # 1409, # 1410, # 1411 and # 1412 - Specifications, Tests, Investigations and Technical Services.

Headlights and Lanterns. Evaluations and tests being conducted on 26 samples from six manufacturers. Plastic battery cases for the standard headlight are being evaluated at the Lab. Field tests of some sample headlights using plastics will be conducted as soon as the manufacturer supplies the test units now on order. The possibility of obtaining a paper tube type battery case (or holder) for the "Economy" headlight permitting use of "D" cells is being investigated. Hand lanterns having features such as plastic cases, using "D" cells, ability to float, etc., are being evaluated. Specifications (or purchase descriptions) will be prepared or revised to include features that appear desirable when tests have been concluded.

Belt Weather Kit. An assembly standard is being prepared so that orders for complete units can be placed through GSA by the field. Individual components must be ordered separately at this time. The standard will be completed as soon as a more suitable psychrometric slide rule can be obtained from manufacturers. Current models are based on 0-2000' elevation range; 0-7500' or greater range is needed.

Electrified Panels. A map display system using colored lighted pins has been demonstrated at BEC. Possible use by dispatchers etc., should be considered.

Grenade Launcher. A "Gren Gun" was recently demonstrated at Beltsville by the American Research and Manufacturing Co., Rockville, Maryland. It is a device which fires 2-1/4 lb. plastic grenades of dry chemical fire extinguishing powder by means of compressed air. Range is about 200 feet. Additional tests will be made as improvements are made by the company.

PA Systems. Evaluations of new systems is continuing as follow-up on the last tests and report prepared by BEC.

Fire Danger Rating. The application of electro-mechanical means to the computation of Fire Danger Rating is being studied. Dave Bruce's "Black Box" and the stacked slide rule (with lights, etc.) approaches are under consideration. The possibilities of integrating fire weather telemetry systems and computers has been suggested.

Radio and Radiotelephone Equipment. Tests have just been completed on the ITT commercial Radiotelephone unit and a report is being prepared. Tests are currently being run on Motorola's new model of their dry battery powered LO Repeater unit. New G.E. base station is to be tested next at BEC. G.E.'s "Porta-Mobile" radio has been tested and accepted. Latest bid prices were \$667.25 each on 48 units with about \$100.00 per unit additional costs for the mobile adapter kits. G.E.'s carrying cases for their portables are to be constructed of high visibility "Herculite" at the suggestion of BEC. Motorola now has their Personal Portable available in the 400 mc/s band. Multiple frequency transmitter-receiver radios are now available; G.E. has a four-frequency unit - Motorola could probably also furnish similar competitive equipment. G.E. has receivers available for simultaneous standby on two frequencies. A definite trend toward transistorized equipment exists among the manufacturers (e.g. G.E. "MASTR", Motorola "MOTRAC" and RCA "SUPER CARFONE"). Cost of such equipment is expected to go down from current prices (\$700/mobile Motorola MOTRAC transistorized-receiver radiophone). Tube equipment is expected to go up in price as manufacturers get further into transistorized production. Greater reliability and less maintenance costs can be expected with the all transistor type mobiles.

Thermo-Electric Power Generating Equipment. "3-M" unit has been lab tested and accepted with a report made to the field. Such equipment is recommended wherever power supply needs for repeater equipment exceeds six months a year. Operation requires about 1 lb. of propane/watt/week.

#### 4. Fire Control Equipment Development Extention

W. C. Wood

Mr. Wood discussed a plan to have Equipment Development Center personnel attend fire control meetings and demonstrate newly developed fire tools.

Productivity in Fire Control can be increased by encouraging field participation and interest in development and use of new tools. Experimental extension tours conducted on Forests in Regions Four and Six last year were successful.

#### Discussion

The consensus was that such demonstrations would be desirable and should be scheduled whenever possible to coincide with planned meetings. Information on this program will go to the field.

## FIRE PLANNING

### A. 1965 Fire Control Planning Procedures.

#### M. Tester

Planning is one of the five important components of management leadership. Through it we answer the 'WHO - WHAT - WHERE - WHEN - WHY - and HOW'.

Successful fire planning must consider:

Forecasts - Expected Fire Weather.

Objectives - FSM 5191.

Policies - FSM 5191.

Procedures - How It Will Be Done.

Programs - Timber Management, Range, Multiple Use.

Standards - Hour Control.

Organization - Prevention, Detection, and Attack.

Budget - Final Costs.

The current fire planning project is Service-wide, with personnel in 10 Regions, 127 Forests, and over 800 Ranger Districts involved. With such participation, many problems have undoubtedly been encountered and new ideas developed.

#### Objective.

1. To study scientifically the needs and application of fire control using current data, findings, research, new techniques, equipment, and present-day Forest values, unit by unit nationwide.
2. To provide nationwide fire control performance standards to meet current resource management objectives, and the best integrated system of equipment, manpower, methods, and facilities to meet these standards under varying conditions of risk, hazard, weather, and topography.
3. To provide a uniform and accurate measure of performance among fire control units.

4. To form a basis for budget requests and for equitable distribution of fire control funds to Regions, Forests, and Districts.

#### Policy

1. National fire control planning should provide forest fire control, at the least possible cost, that will hold loss to an annual or periodic predetermined maximum required for successful management of forest resources.
2. Fire control will be planned to provide the standard of protection needed for successful management of National Forest resources, regardless of current financing.
3. National instructions set the guidelines within which Regional instructions are prepared and planning done. Regions may expand these guidelines as necessary.
4. Values protected are a financial control over total justified expenditure.

#### General Guidelines

1. Current and expected methods of aircraft use including air tankers, use of smokejumper and helitack crews, new mechanical developments and similar changes should be reflected in plan revisions.
2. Generally, there should not be a buildup in planned strength, but rather the objective should be to see what substitutions and eliminations can and should be made.
3. Many past practices can be dropped since better and more economical methods are available.

All of these criteria emphasize the need to develop a sound, efficient, and economical organization that will meet resource management objectives at minimum cost. This means that new methods, techniques, or procedures should be incorporated in our fire plans to the fullest extent possible. In general, current fire planning should be a thorough, detailed analysis--not just a rehash of old plans.

Not many years ago, the backbone of our fire control efforts consisted of fixed detectors and ground attack forces. Transportation was by truck, horse, and mule, and communications by telephone. These facilities are still an important part of our fire control organization. They can, however, be supplemented by many more modern techniques and methods.



These items can assist in meeting fire control objectives. When used, however, they should result in a reduction somewhere else in the organization. In other words, they should not be superimposed on the conventional organization. Such action would result in duplication of effort and unnecessary cost.

In addition, there are other factors which should be considered.

#### Public.

Oftentimes, detection standards can be adequately met by public action. This might be by residents of a community or by the general traveling public. In such cases, manning a fixed detector to obtain the same coverage would be a duplication of effort. When public detection is established as part of the plan, it is important to provide adequate and convenient communication facilities.

#### Cooperators.

Cooperators can often meet detection or attack requirements for certain areas within the planning unit. Such contributions should be fully explored when developing the plan in order to avoid unnecessary manning of Forest Service positions.

#### Project Personnel.

Last, but far from least, are the project personnel. Many planning units have rather large numbers of these people who can assist in meeting fire control objectives. This is especially true in the attack portion of the plan. Full consideration should be given to the contributions they can make when selecting the final fire control organization,

#### Coordination.

Plans must be coordinated with adjacent Forests, Regions, and agencies. Frequently, facilities of other agencies will be able to materially assist the planner in meeting fire control objectives on a given planning unit.

#### Procedures

Now for a look at the fire planning procedures. Basically, the national instructions are the same as those used five years ago. They cover prevention, detection, and attack, and provide the broad guidelines within which Regions will conduct their planning.

#### Prevention.

Detailed guides for prevention planning are contained in FSM 5112. They are based on analysis of - RISKS - Hazards and Man Caused Fires.

Basic factors to consider are:

1. What is causing or could cause fires.
2. Where fires occur.
3. When fires occur.
4. Why fires start.
5. How fires start.
6. Who starts fires.

Much of prevention planning is based on analysis of man-caused fires. This, by itself, is not enough, to form the basis for a prevention plan. In addition, risks and hazards must also be analyzed.

Presuppression.

In planning the presuppression organization, we determine the detection and initial attack forces needed to meet fire control objectives. Several factors play a part in this phase of the planning. Some of the most important are:

Fire Weather	Resource Values
Fuels	Seen Area Maps
Fire Occurrence	Hour Control Zones
Access	

Weather governs the size of initial attack crews and along with fuels helps to classify hour control zones. Hour control zones and access determine the location of attack forces. Seen area maps, resource values, hour control zones, and fire occurrence all play a part in determining the location and number of detectors. Resource values and hour control zones determine the number of initial attack forces. If the basic data is accurately prepared and thoroughly analyzed an effective, efficient organization should result.

Here are a few problems encountered in Region 1:

1. Prevention

a. Risk Maps

FSM 5112 contains specific guides for rating risk areas and priority of treatment. This is one area where Region 1 has experienced difficulties. These guides

work fine where there is a heavy man-caused fire occurrence. Many of our Districts do not, however, have areas with sufficient man-caused occurrence to classify as heavy or medium risk. Still, the rangers feel some of their areas should be classified as high or medium risk in order to attain man-caused PARS. In other words, risk rating is only relative from the standpoint of prevention planning. Whether a District has 100 or 10 man-caused fires per year would not affect the rating of risk areas.

b. Hazard Reduction.

Region 1 has a serious fire potential in some high hazard fuels on three adjoining Forests. This is the beetle-killed lodgepole pine area on the Bitterroot, Beaverhead, and Deerlodge Forests. In the late 1920's, beetles killed approximately 60 percent of the lodgepole on over 1,000,000 acres. Much of the dead timber is now on the ground in the form of rotted windfalls. This combined with the remaining snags and inaccessibility has developed a serious fire hazard.

Our objective is to include this area in the current fire planning project. Proposed hazard reduction work will be broken into two phases. The first phase consists of mapping the area and planning access needs. The second will be physical reduction of the hazard. Criteria were developed for mapping the area and planning access. Most of this work has been completed. Some physical abatement has been accomplished primarily by contributed time of fire control employees. Cost data collected will be used in planning total needs for the area.

2. Detection.

- a. One problem in planning a detection system is to obtain adequate coverage at reasonable cost. Combined air and ground detection has been used in Region 1 for quite some time as an answer to this problem. It was first developed in the late 1940's on a single management unit.

Major benefits are:

- (1) Less fixed detectors, and
- (2) Flexibility.

This type of detection consists of a few key fixed detectors combined with plan-wise use of air patrol. It is now included in our fire control planning Region-wide.

3. Attack.

- a. We have found it extremely difficult to determine the effect of retardant on initial attack needs. We know there are benefits, but the question is "How Much." Will it change fire behavior on a given fire from 1 to 2 hour control? How does it affect the number of men needed in initial attack crews? Answers to these questions have a direct bearing on the final proposed fire control organization. This is an area where more research and study is needed.
- b. Initial attack standards in FSM 5191.32 state that forces will be planned to cover the following percent of hour control zones based on value classes.

<u>Value Classes</u>	<u>Minimum Percent of Hour Control Zone Covered Within Time Limits</u>
6	95
5	85
4	70
3	55
2	40
1	0

These standards are not entirely clear. Do the percentage objectives apply to each of the different hour control zones situated within a given resource value class - or - do they apply only as total coverage within a resource value class? Region 1 has interpreted them to mean the former.

4. General.

a. Resource Values

(1) Criteria for classifying resource values are outlined in FSM 5191.11. They cover timber, soil and water, grazing, wildlife, recreation, improvements and miscellaneous values. They are not coordinated with multiple use classification of land management areas. Conceivably, we could have an area rated as Class 2 which would be highly important from the standpoint of multiple use. We feel that resource value guides should be coordinated with multiple use guides prior to the next 5-year periodic review.

(2) In some respects we have also found certain resource value guides difficult to work with. This stems from the fact that values are based on adjective descriptions. This makes it difficult to obtain uniform understanding and application when more than 100 Ranger Districts are determining values.

(3) There is also some question whether an area with two equal value ratings should be assigned a value class 1-point higher. Quite often an area will have 2 value ratings of 3. Under the Manual guidelines it would then be assigned a value class of 4. The frequency with which this occurs leaves some doubt as to its accuracy.

b. Project Personnel.

(1) In developing our 1965 fire control plans, we have encountered a serious problem in relation to the contributions from project personnel. In the past, project crews have been used for two purposes:

(a) Hold men until they are needed in fire control positions.

(b) Provide some of the attack strength needed on the District.

The emphasis on contracting project work and the trend to more efficient mechanical methods has greatly reduced the size and number of project crews on the Districts. The result is less benefits to the fire control organization from project work. It also has a serious effect on the manpower available for suppression work on project fires.

c. Cost vs. Damages.

In Region 1, we have found that conducting fire control planning under mechanical methods or procedures is not enough. Often the results cannot be justified from the standpoint of costs versus damages. It then becomes necessary to adjust the indicated organization in order to obtain one that can be justified. Unfortunately, there is no formula or procedure for doing this. The usual procedure is to determine where calculated risks can be taken on the basis of past and current factors such as fire occurrence, fuels, and resource values.

## Discussion of Problems in 1965 Fire Control Planning.

Resource Values. Values are not correlated with multiple-use plans. Most Regions found it difficult to get uniformity between units using current criteria. One Region has approached resource value classification from the standpoint of asking, "What is the damage potential if a fire burns here?". The problem of reclaiming land burned over needs to be given more attention. We do not have a systematic way of recording burned area and relating this to resource value classes. It was suggested that a blank be provided in the 5100-29 to indicate the resource value where the fire occurred.

Field people feel the periodic review of fire plans is very costly for benefits received. Particularly, when cost estimates are so much more than what we receive or expect to receive.

The periodic review does give comparative ratings between Ranger Districts. Analyzing the fire control operation from top to bottom is necessary at least once every 5 years. Other functional activities do this in the Forest Service. The periodic review of our fire plans is basic to our whole operation. It is on the basis of the facts collected that we allocate our resources among the units.

Other agencies of government are impressed with this planning process. Region 5 had occasion to take a GAO audit team through the entire planning process. It convinced the team we had done the best possible job under the circumstances and they were completely satisfied with our approach to deciding needs and allocations.

Cooperators are interested in our planning process. For example, the California State Division of Forestry uses the same planning approach.

Several Regions noted problems in using and handling the idea of "average worst" Fire Year and Day.

Region 4 felt there was not enough weight or consideration given to boundary line fires where fires burn onto NF protection areas or where mutual aid is required.

Each Region should summarize problems encountered during this periodic review and make them a matter of record. We can change our instructions now to improve definitions and be in a position to do a better job next time.

## PREVENTION-LAW ENFORCEMENT-TRESPASS

### A. Meeting Prevention Objectives Through Key Projects

H. C. Frayer, R. Johnson, H. P. Gaylor, J. E. Sanderson,  
and M. E. Hardy

#### 1. Task Force Report: A National Fire Prevention Plan

Members of the Task Force reported on their contributions toward a National Fire Prevention Plan. These included a recommended format which parallels the Prevention Plan format now in use. In addition to general policy statements, this format would provide for a graphic analysis of fire causes. It would show the delineation of certain specific causes by geographic areas in which the Washington Office would direct the area-wide measures to be taken. Actions would generally be given broad treatment in such a national plan, but in some cases might be very specific. An example of specific action directed by the Washington Office would be the outlining and assignment of measures to cope with railroad fires.

The National Fire Prevention Plan will include coordination of broad scale fire prevention research projects. This will be accomplished by discussion of the need and objectives of such projects, in order that all field units will know the scope of specific prevention research projects.

#### Discussion

A National Fire Prevention Plan was recognized as desirable for emphasis and direction to all levels. Statistical methods and possible revisions to the 5100-29 fire report were discussed at some length, but with no apparent unanimity of opinion. It was brought out by several participants that the National Plan should strongly emphasize the need to involve all personnel in prevention.

#### 2. Progress on a Selected Management Unit - Accelerated Prevention Work on the Pike National Forest

The Pike once had the highest rate of increase in numbers of man-caused fires in the National Forest system. It has been financed for acceleration of prevention activities as a demonstration area. This report was primarily intended to bring out what was being done to accelerate prevention work. It brought out the appreciable decline in number of fires since it was started.

Each Region should have at least one such unit where prevention work may be concentrated and demonstrated as a model for others.

### 3. Prevention Signing

The work of the Task Force relative to Fire Prevention signing included Regional recommendations, the Region 5 analysis, and the PSW Station continuing study. Examples of sign coordination problems, both in good and bad signing, were shown as color slides. Task Force recommendations included:

- a. Messages - stress, brevity, clarity, and action response.
- b. Sizes and colors - examples: green and white for informational-permissive; red and white for regulatory-restrictive.
- c. Sign mounting - types of frames compatible with overall sign program; located in keeping with traffic safety considerations.
- d. Extended use of Smokey head on various classes of prevention signs and posters.

### Discussion

Included types of publics we have and how to reach. Local and Service-wide needs, relative to sign coordination by Engineering (National Sign Handbook to include), VIS and fire-oriented interpretive signing for the Interstate or other traveler, a proposed administrative study with PSW in extending the use of European-type symbolic signs.

### 4. Mass Media. - Are we getting all we can from the Smokey image?

Current CFFP program objectives and methods were presented as they relate to the initial creation of the Smokey image. The problems of maintaining this image through cooperative controls, and the needs for internal discretion in the use of Smokey were stressed. Wide encouragement is made for the use of Smokey in connection with appropriate localized prevention signing. As a part of this encouragement, and to maintain a standard format, "paint-by-numbers" guides for construction have been reproduced. Similarly, Smokey Bear heads are being made available in finished form for attachment to signs. Use of Smokey will be covered in future sign handbook instructions.



B. Law Enforcement and Fire Trespass

1. Trespass Case Load - Ed Ritter

Regions have a variety of fire problems. All have incendiaries. All have careless forest users, many tourists, irresponsible squirrel hunters, spite burners, cagey cattlemen, perennial night hunters, and diesel engines. Who hasn't witnessed the results of debris and refuse burning, sparks from a house or stove flue, a cooking or warming fire; or meadow burning, land clearing, slash disposal, or even prescribed burning. All of these fires are man-caused; most are preventable. Are you doing all that can be done to reduce carelessness, and to eliminate the big risks?

Fire law enforcement is a recognized phase of fire prevention. It is a retardant. It works somewhat like a chemical retardant. It does not last indefinitely. And so there must be a planned program of training and followup to keep enforcement effective.

The Washington Office has received 279 trespass cases during the last ten years or an average of 27 per year. Two hundred and eight cases have been settled through litigation, compromise, friendly settlement or have been declared uncollectible. Six Regions have fires with claims of \$50,000 and over in the Washington Office. Those of you who have worked in Region 5 in the late fifties may have recollection of some of the fires with noteworthy claims.

Region 2 has no cases pending. Regions 7 and 9 have few cases. Region 10 is unique in that the Kenai Lake Fire is the only one submitted to Washington during the past 10 years.

Of most concern is the time lag in submitting trespass reports to the W.O. FSM 5331.6, Fire Trespass Reports, issued as Amendment No. 139, November 1964, requires fire trespass information to be submitted to the Washington Office within 60 to 90 days after the fire starts. The Regions have not fully complied with it.

The average interval in submitting fire trespass reports by Regions compiled from the 85 cases now in the Washington Office is:

<u>Region</u>	<u>No. of Cases</u>	<u>Average Report Time*</u> <u>Months</u>
1	6	13
3	11	11
4	8	13
5	29	18
6	18	13
7	2	12
8	7	22
9	3	9
10	1	12

\*From date of fire to date report received in W.O.

There are extenuating circumstances in some cases. In many instances, delay has contributed to weakening the case. This has resulted indirectly in a financial loss to the Government, either through reduction in collections, an inequitable settlement, or a futile court case.

What can be done to speed up submission of cases? They should be complete and contain all material required to make it as strong a case as possible. A check list of items that are important are shown below. If these are complete in every detail, the delays in submitting cases to OGC and Justice will be shortened.

CASES CAN BE SPEEDED UP BY INCLUDING

1. TIME OF ORIGIN IN STANDARD TIME (NOT MILITARY)
2. LOCATION BY LOCAL AND LEGAL DESCRIPTION, STATE AND COUNTY
3. ACREAGE BURNED BY FEDERAL, STATE, PRIVATE, ETC.
4. FORM 5100-29 (ITEMS 1, 2, and 3 TO AGREE)
5. DETAILS ON DISCOVERY AND SUBSEQUENT ACTION
6. INFORMATION ON TRESPASSER
7. BASIS FOR ACCUSATIONS AND WITNESS STATEMENTS
8. LAWS, RULES AND REGULATION VIOLATED
9. COPIES OF TIMBER SALE CONTRACT SUPPRESSION CLAUSES
10. TIMBER AND RESOURCE DAMAGE SUPPORTED BY APPRAISAL DATA
11. FINANCIAL STATUS OF ALLEGED TRESPASSER

The following training course may be of interest to better qual investigators:

USDA GRADUATE SCHOOL CORRESPONDENCE COURSE

325C Legal Aspects of Investigations--Criminal Evidence and Procedure

\$28 Fee, plus \$10 for supplies and postage.

This is a basic course covering a variety of subjects with criminal aspects.

It is especially for lay people, those not trained in legal work.

Helen Kempfer handles correspondence.

Joe D. Cummings is course instructor.

Graduates

Wm. H. Brandau	Kisatchie Staff	R-8
Bill Cummins	RO Staff	R-6
Fred Prussing	RO Staff	P-4
James Butler	Fishlake Staff	P-4
Francis E. Sheldon	Modoc Ranger	R-5
Ed Young	RO Staff	R-9

2. The New U. S. Commissioner Act (P. L. 88-837) - J. Spring

With President Johnson's signature on August 31, 1964, Public Law 88-837 permitted action we have long wanted.

The Law authorizes trial by U. S. Commissioners of petty offenses committed on National Forests and National Grasslands--

--It gives a quick, convenient way (to both the violator and the Government) to dispose of these smaller, "JP type" cases by Federal action.

--It will relieve the attorneys and the District Courts of many small cases.

--By helping to decentralize the disposition of cases, it should bring our Rangers closer to a critical phase of their job, resulting in -

- More attention to trespass.
- More effective law enforcement.

Each of us can cite numerous instances of failure to get action in small, but locally important, cases because--

- Crowded U. S. District Court dockets and relative priorities.
- Action in County or State Courts has not always been satisfactory.
- Applicability of State Statutes.
- Some State officials feel that National Forest violations are strictly a Federal responsibility.
- Forest Service prestige sometimes suffers when we rely on local officials for law enforcement action and prosecution of National Forest cases.
- In general, Federal action impresses violators more than local action.

To apply the new law, we'll need--

1. Designated U. S. Commissioners.
2. Well informed and well trained Forest Officers, skillful in the application of the new law and related procedures.
3. Certain working tools (printed copies of regulations and instructions suitable for carrying in the field; citation forms, if to be used).

Assistant General Counsel Koebel's memorandum of January 13 written to Regional Attorneys and Attorneys-in-Charge, discusses "the manner in which the newly-enacted legislation should be implemented by the Forest Service and this Office."

OGC will:

--Determine which Commissioners already designated that will be used by our men.

--Where designation is needed, take action to get the U. S. District Judge to make it.

--Ask U. S. Attorneys to seek the designation.

--Inform Forest Officers in the practical use of the new legislation.

We should follow up on Koebel's instructions, making sure that Forest Supervisors have identified their needs and have made them known.

Through close cooperation between Forest Supervisors and Regional Attorneys we should take appropriate steps to be sure that newly-designated U. S. Commissioners become fully acquainted with Forest Service objectives and problems.

As for informing and training Forest Officers, we need--

--Directives issued on proper action by Forest Officers.

--See that Forest Officers are given training in all necessary details.

- Understanding of regulations.
- Use of citations.
- Understanding and skill in handling violators, with or without making arrests.
- Procedure in U. S. Commissioner's Court.
- Relationship of the new procedure to existing ones.

As for the working tools which will be needed in the field, we need to--

--Develop instructions, possibly in the form of a field handbook, outlining the new law and related procedures, including the use of citations.

--Develop citations forms and furnish to Forest Officers.

### 3. New Direct-Reference Authority

A. G. Brenneis

The new direct-reference authority holds promise of speeding progress in the processing of claims less than \$5,000. It presents a challenge to the Forests and Regions to do a faster and more accurate job of preparing and submitting trespass reports. A look at the record will indicate that perhaps the initial stages of an action are more of a road-block to speedy completion of cases than the interim between the period of submission to Washington Office and referral to the Department of Justice. The deliberations of the Office of U. S. Attorney cannot be calculated. There are too many variables that influence speed of action in this area.

In Region 3 cases we can figure on 4 to 6 months from time of dispatch to Washington Office to referral to the Office of the U. S. Attorney. Through direct referral it should be possible to cut the time from Regional Office to U. S. Attorney to 30 days with little trouble.

The speed of action should be helpful to successful conclusion of cases because:

- a. The case and facts are still "hot."
- b. There's a close geographical tie between Forest Service Counsel and the U. S. Attorney. This permits opportunity for discussion about questionable points of the case.
- c. The witnesses are still readily available. In some of the current cases, the key witnesses are scattered, some are retired, and some are deceased.

The system also places some added responsibilities on Forest Service personnel.

- a. The Office of the U. S. Attorney will ask for solid facts. He's reviewing the case and making the decision--not his head office. He'll want documentation of authorities.
- b. Our cases will have to be well investigated and prepared. Any loose ends may rise to haunt us.
- c. A series of weak or poorly prepared cases could influence the U. S. Attorney's attention to our cases. He, too, likes sound cases and "to bat a good average" of wins.

The new Direct-Reference Authority looks good and should bring many cases to a relatively speedy conclusion. It, however, poses some challenges to Forest officers and the Attorney-in-Charge.

4. Requirements, Needs, Plans, Training, Personnel Assignments  
for Law Enforcement and Trespass Work John T. Koen

This subject covers a field that has always been a problem. In fact, our progress in this work has not been marked by the great strides we have made in other phases of our work. There are reasons for this--I'm sure you are aware of them, so we won't use time to go into the WHY.

The question is--WHAT do we need to do to improve?

- a. Of course, we need more complete, concise, accurate trespass reports; backed up by expert, intensive investigations. There is a long list of items covering the composition of a good report--let's take a look at a couple of them. One important point our people seem to miss is that we speak a professional language that is not usually clear to the attorneys and courts who handle our cases. Details of fire suppression costs--given in fire terminology--are difficult to explain. Also, our analytical damage appraisal--simple to us--may be so much Greek to a trial attorney, Judge, or Jury. This was brought out to us by the U. S. Attorney handling a recent fire case. He asked for an appraisal showing the difference in the value of the land before and after the fire. This, he said, might be the basis on which damages would be awarded.

One more point--the courts do not like military time.

- b. Assuming we get this accurate, complete report--how soon after the fire should it reach the Washington Office? Present standards require--
  - (1) Complete report, with estimated costs and damages, 60 days after fire starts. Is this reasonable?
  - (2) Complete resource damage appraisal--90 days after fire is out. It is difficult to determine how much timber will be salvaged in this time.
  - (3) Complete cost tabulation--90 days after fire is out.
- c. It's obvious we must get these cases worked up and in the Washington Office as rapidly as possible, and speaking from experience, it's also obvious that to do this requires planning and training of personnel.

Plans for Region 8 training include--

--Forest and district training sessions to build up alertness of all fire personnel in what to watch for and to train Rangers and Staff in investigation and reporting.

--Train one man per ranger district in locating and preserving evidence, making simple cases, laying ground work for specialists in complex cases.

--Train Criminal Investigators in preparing Forest Service cases and train them to be expert instructors for District and Forest personnel.

Assignments will include--

--Concentrating investigative strength in problem areas. (Region 8 Investigative Task Force is mobilized about 4 times a year. We have 7 investigators - R.O. Branch Chief - 6 Forest investigators assigned to staff)

--Personnel to prepare reports, damage appraisals, and cost records on a project basis. These people would be relieved of other duties until the job is done. The team might include the Ranger--TM Staff--Range--Watershed and Wildlife--Engineering and Budget and Finance. They would consult with TM and Fire Control in the R.O. and with the Office of the General Counsel. This is an expensive business--funds are not usually available--and the cost of preparation cannot be charged to the trespasser.

To Summarize--The Question Was: WHAT do we need to do to improve our law enforcement and trespass work?

We need--

- a. Complete, accurate reports with all attachments in layman's language.
- b. These reports should be completed and processed within required time standards.
- c. To do this job is going to require--
  - (1) Planning in advance.
  - (2) Intensive training.
  - (3) Assignment of qualified, well-trained people to the job on a project basis.

In assignment of personnel it is well to remember that, though employment of professional investigators is very good, most good cases start from observations made by a crew member, or similar person, giving the investigator a starting point or a suspect.



## FIELD TRIP

Visit to Monsanto General Offices and Research Center, St. Louis, Mo.

### Tour

#### 1. Central Research

##### a. Library

##### b. Instrumentation Laboratory

Sophisticated analytical instruments available for use by all Monsanto Technical personnel and outside visitors with problems of mutual interest.

##### c. Corrosion Laboratory

Velocity test (simulating pump and fitting use conditions) of alloys used in fire fighting equipment.

#### 2. Demonstration - W. W. Morgenthaler

a. Mixing of experimental Phos-Chek<sup>(R)</sup> 259 in Forester portable eductor mixer.

b. Spray patterns of Phos-Chek<sup>(R)</sup> 259 from some standard fire nozzles.

- (1) Forest King fog head
- (2) Forest Fog Nozzle 3 gpm
- (3) Forest Fog Nozzle 15 gpm

### C. Discussion

- 1. Monsanto Fire Control Objectives - A. R. Handleman
- 2. Phos-Chek<sup>(R)</sup> Development Program - R. P. Langguth

## SUPPRESSION MANAGEMENT

### A. Communications

#### 1. Large or Multi-Fire Inter-Agency Communications. - Jay Peterson

( Desk ) ( Desk )

Service and Supply Section - (U.S.F.S.) (Cooperators)

(  
Service and supply to all fires and fire camps. Needs communication to report and adjust all needs, changes and excesses (demobilization) of manpower and equipment. Keeps in contact with dispatchers.

Communications (Telephone and Radio) to fit demands.

( Desk ) ( Desk )

Plans Section - (U.S.F.S.) (Cooperators)

Telephone and radio communication to get manpower and equipment inventories, gather intelligence, progress of each fire, keep other agencies posted and obtain weather information for all fire areas.

Information Section - Communication to fit demands.

Obtains progress and current data, keeps press informed and answers queries.

Liaison Officer - Keeps currently informed as to needs and requirements of cooperating agencies. Communicates to fit demands of job.

#### Facilitating Personnel

State Highway Patrol Desk - 24-hour service.

Communication with their headquarters and field units. Telephone and radio (own frequency). Traffic control along all highways.

State Division of Highways Desk - 24-hour service.

Communication with their headquarters and field units. Telephone and radio (own frequency), Closure of highways and maintenance of highway blockades.

County Sheriff's Dept. Desk - 24-hour service.

Communication with their headquarters and field units. Responsible for evacuation and prevention of looting.

### State Disaster Office Desk - 24-hour service.

Telephone service to mobile communication units which are equipped with radios used by each agency involved.

### Fire Weather Forecaster and Weather Bureau Desk

Telephone or radio communication to prepare regular forecasts and special fire weather forecasts for special areas.

Depending upon the situation and the location of the fire or fires, other agencies or organizations may become involved such as lumber companies, Red Cross, Salvation Army, Military and National Guard, Utility Companies, Land Owners, Department of Employment, etc. Under these circumstances, facilitating personnel representing these groups should be assigned to G.H.Q. with adequate communication facilities to service their needs.

### New Tools That Could Be Used

It is technically possible to set up a TWX with tape attachment at G.H.Q. or fire camp on a side band operating off any radio frequency to fill grocery orders, weather reports, manpower and equipment orders, public information, etc. Copies of manifests could come direct to fire camp or G.H.Q. as well as to the dispatcher's office.

Facsimile machines may be used in the near future to transmit information such as maps, orders, weather information, or any other information that is required.

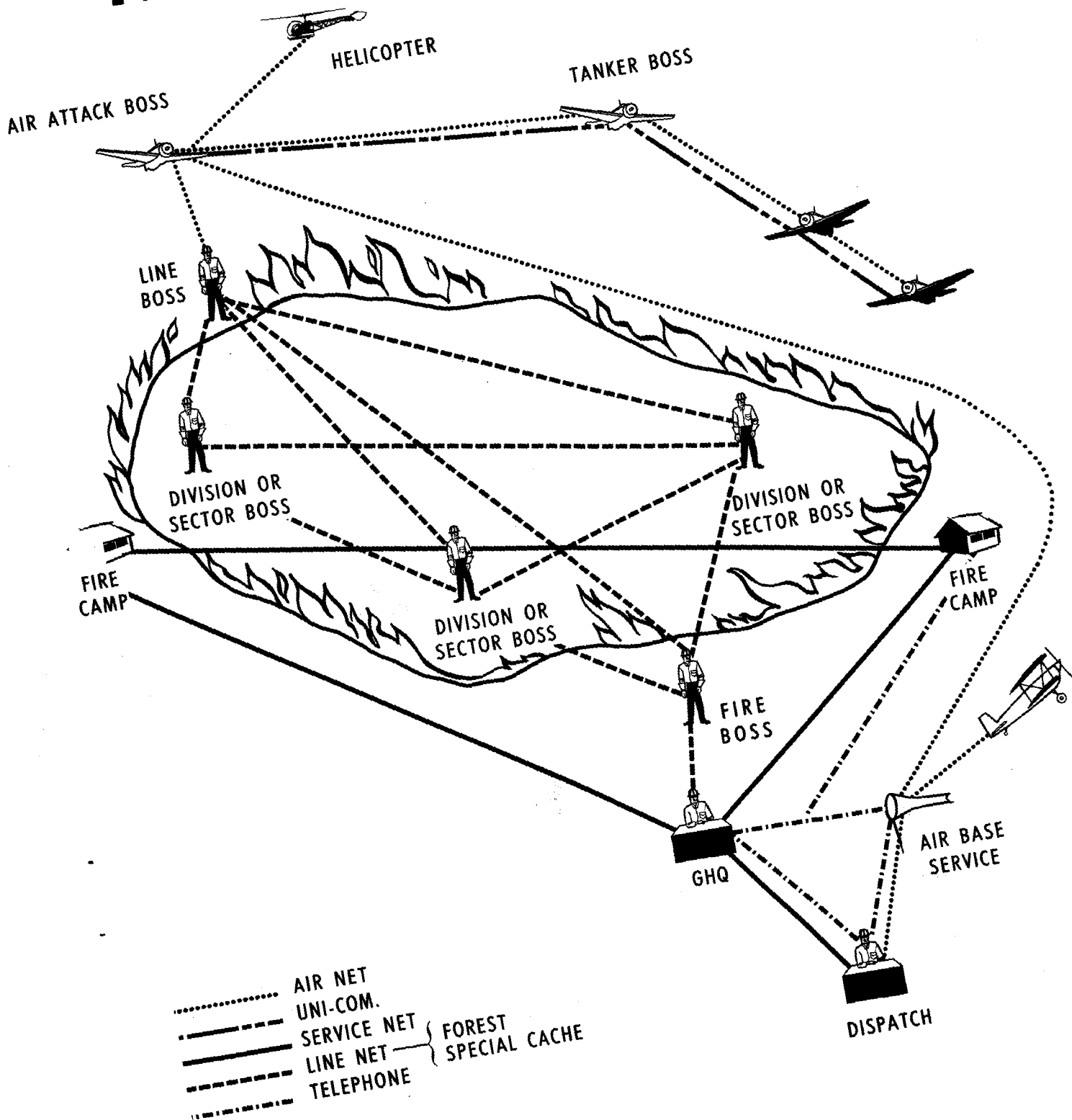
### Discussion

Radio operating procedures must be strictly enforced to make radio use efficient. Forest dispatchers can help on day-to-day basis by having responsibility and authority for keeping radio short and to the point.

Tape recordings of actual conversation can be used at Ranger and other meetings to show there is a problem.

There is a need for lesson plans for disciplining radio procedure.

**COMMUNICATION NET**  
**Multi-Division Fire**



B. Air Drop Retardants - Effectiveness and Limitations. - D. Kyle

A great deal has been written about retardants by research organizations and suppliers. I have a file that is about one foot thick and I suppose most of you have similar files. My analysis of the information we have indicates that the use of anything other than long-term retardants is a waste of money.

Some reasons for my statement are:

1. Use of retardant for initial attack on a small fire is generally a holding action until crews can reach the fire and construct a line around it. A short-term retardant is not effective if the need for the retardant exceeds one hour. There are cases where one hour of holding time is enough. But my estimate would be that this occurs less than 10 percent of the time in Region 1.
2. Most retardant use in Region 1 is in heavier fuel types. Where stringers of timber or heavier fuels are interspersed with light fuels, most of the retardant use is confined to the heavy fuel sections.
3. Use of a long-term retardant permits construction of a lower standard fireline than would otherwise be required.
4. Use of retardants in fast-spreading light fuels for other than indirect attack or to knock down the leading point of the fire is an expensive method of line construction. If we could design a tanker that would materially lengthen the effective ground pattern of retardant drops we might be able to justify more use in light fuel types.

Effectiveness of retardants appears to be closely related to the volume of available fuels. If fuel moisture can be raised to around 20 percent, the combustion rate is materially slowed down and no spotting should occur. Short-term retardants such as Bentonite lose most of their effectiveness within one hour.

The Northern Forest Fire Laboratory has been doing some work this winter which appears to be pointing out the direction we should be going in selecting and applying retardants.

The following is quoted from some information we recently received from the Lab.

"Research on long-term and short-term retardants has produced methods predicting the amount of retardant needed for various fuel and environment conditions. In the case of long-term retardant, a primary consideration is the amount of dead fuel per acre to be treated. This figure is approximately two-tenths of a gallon per hundred square feet for each ton per acre of dead fuel. Field and operational testing of the

long-term retardants have increased the confidence in long-term retardants and clearly demonstrate that a very effective fire-fighting tool is available for more extended use throughout the Forest Service. It is felt at the present time that this generation of retardants has reached a level where further radical improvement of the retardants will not be forthcoming for some time.

"The next major gain in the effectiveness and cost savings must come from better application and delivery systems of these retardants to the fireline. For aerial delivery, the largest problem seems to be the manner in which the retardants are ejected from the airplane. The present method results in a poor pattern along the ground. In the center of the pattern is a large concentration of retardant which may exceed 4 or 5 gallons per 100 square feet. Along the edges and over a considerable area is a very thin, ineffective pattern of less than half a gallon per hundred square feet. Both areas constitute lost retardant. A longer fireline could be built with each retardant load with a consequent saving of time, money, and possible fire losses if a more effective means of delivering the retardant from the airplane could be developed.

"A safety feature would be realized if the new method would prevent the aircraft tail surfaces from becoming coated with retardant during each drop. Eliminating the concentrated load from existing tankers would also lessen the hazard to firefighters on the ground."

Most of us have been in the retardant program long enough to understand the weather, topography and fire intensities that limit the effectiveness of aerial retardant operations. We, in Region 1, still have some cases where retardant drops are requested as a desperation tactic. We are trying to eliminate these. Mid-day use of retardants except for initial attack on small fires, on spot fires, or small line slopovers are discouraged in our Region.

There have been some questions regarding the use of retardants in heavy timber canopies. We know that some of these canopies can intercept as much as 1 inch of rainfall, so we know that it will take a large amount of retardant to reach the ground. Tactical use of retardants in these areas should be limited to possible prevention of crown fires.

Before closing, I would like to make a few remarks regarding the use of lead planes. If a helicopter is on a fire, I strongly recommend its use for spotting retardant drops and leave the lead plane at home. The 'copter can hover directly over the

desired drop spot and there is no question in the retardant pilot's mind on where the drop is to be made. When the retardant pilot has the drop spot identified, the 'copter can move to one side and have a ringside seat to evaluate the drop. The 'copter is also in close contact with the crew on the ground and can determine in advance that the line is clear before the drop is made.

### Discussion

#### Dropping of retardants - Problems

- (a) What retardant?
- (b) How much retardant?
- (c) How to measure easily?

Tanker efficiency has risen from 30% to 50-60%. Mid-day knowledge dropping - no good except on spots, flareups. There is lack of/ of capability of air tankers by field personnel. Some participants felt spotting or directing air tankers with helicopters is dangerous. Smoke-marker on T-34 can do cheaper and be just as effective. See Arcadia EDC Equip Tip - T-34 Smoke-marker - September 1963.

C. Improving Fire Suppression Management. - R. W. Bower

Primitive or prehistoric man, when he descended from trees, or crawled out of caves, had to learn to use fire as a servant in order to keep himself warm and cook his food. In order to use fire as a servant he had to learn to control it;--keep it within a given perimeter and control the energy output to meet his needs.

He did this by building fire in natural bare openings or by removing the fuel from the perimeter of the area in which he wished to contain the fire. He controlled the energy output by controlling volume of fuel he placed on the fire or by retarding the burning by application of dirt or water.

My premise is that we have not improved on the basic concept of fire control in ten thousand years.

Our progress has been made in the techniques and procedures of carrying out this basic concept of removal of fuel from perimeter to mineral soil and application of energy retardants to the glowing flame and embers for mop-up and final suppression.

I will use Region 5 as a frame of reference for this discussion.

1. Fire suppression management defined and described.

Fire suppression is the work of confining and extinguishing a fire beginning with discovery.

The art and science of assembling, organizing and directing a quantity of people, machines, goods and services for the purpose of effecting a control line on the perimeter of a fire as rapidly as possible.

2. Initial attack phase. Detection to attack.

Fire suppression starts with initial attack.

Speed is the most important single factor in initial attack effectiveness with strength of almost equal consideration.

Basically an ignition of wildland fuels results in a size growth and energy release in relation to time that approaches a geometrical progression rather than an arithmetical progression and varies with weather, topography and fuel type.

a. Speed of Attack. Under the concept of hour control, standards for allowable travel time can be established for fuel types at a given level of fire danger.

Elapsed time standards can be established for such operational steps as report time and getaway time.



Any time lag that develops increases the chance of the fire getting too big to handle by initial attack forces.

This is particularly true of aerial attack systems. The entire concept of aerial attack is to buy time. Anything that delays report, getaway and travel time tends to offset the effectiveness of aerial attack.

b. Strength of Attack.

5 to 7 men arriving within hour control standards for fuel type and fire danger level or 1,000 gallons of retardant delivered by air appears to be effective in stopping about 95% of our fires at class A or B.

3. Reinforcement Phase with control within current burning period.

When the first attack unit fails to catch a fire at class A or B, the fire requires reinforcement action.

Our most effective reinforcements have been bulldozers where terrain and cover permit and well trained suppression crews where cutting hand line is the paramount problem. In some cases aerial retardant support has been quite effective in tactical support of reinforcement crews.

The result of this increased use of trained suppression crews and tactical aerial support has shown a definite effect on distribution of size classes of our fires. Data has not been developed to summary stage but indication is that we are stopping more fires in the 50 to 100 acre size range with fewer going to the 1,000 to 2,000 acre size class or overnight control phase.

This increased effectiveness leads to less need of fire camps and second shift mobilization of large numbers of overhead.

4. First night control phase.

When fires are not caught in the first shift phase, the fire usually requires second shift manning and overhead mobilization and establishment of one or more fire camps.

The first key to securing first night control is the proper determination of probable fire behavior and the probable perimeter at estimated time of control. This should be done early enough in the first burning period to get control lines in and strengthened before the beginning of the next burning period. A time lag in this determination can be very significant.

The second key is to determine the number and type of crews and equipment and their proper distribution to get the job done.

A significant item that is sometimes overlooked is the fact that lack of access may limit the speed of line construction to the two lead crews on the flanks of the fire. Mobilization of large numbers of men and equipment can be very wasteful unless timed with the development of perimeter access.

5. The basic criteria for any fire suppression management is - Will this strategy, tactic, or procedure result in final perimeter control at a faster rate?

6. Land Management Phase.

Fire control must be part of the multiple use team and help write the total land management prescriptions area by area.

Discussion

Many were concerned with one important segment of the fire organization--fire crews. Are we taking too much money away from the small, initial attack crews, and putting it into overhead and high-grade structures, etc.?

## NATIONAL PROGRAM OF FOREST FIRE RESEARCH - J. S. Barrows

A summary was presented of plans for all forest fire research projects in the National Program of forestry research. Current progress on several projects was illustrated with a series of colored slides. A total of 28 fire research projects is planned with about three-fourths of the effort being centered at the three forest fire laboratories. The projects are as follows:

### PLANNED FOREST FIRE RESEARCH PROJECTS (Numbers show line project designation)

#### Fire Prevention and Hazard Reduction

##### Prevention of Man-Caused Fires

PSW-2105    Berkeley, California  
SO-2102    Alexandria, Louisiana

##### Fuel Break

PSW-2104    Riverside, California

##### Prescribed Fire and Hazard Reduction

INT-2107    Missoula, Montana  
RM-2102    Flagstaff, Arizona  
SE-2101    Macon, Georgia

#### Fire Behavior

##### Fuel Physics and Chemistry

INT-2104    Missoula, Montana  
SE-2104    Macon, Georgia

##### Fire Physics and Chemistry

PSW-2103    Berkeley, California  
INT-2103    Missoula, Montana  
Pioneering Research Unit -- Fire Energy Systems,  
Macon, Georgia

##### Fire Behavior

PSW-2107    Riverside, California

## Fire Meteorology and Lightning

### Forest Fire Meteorology

PSW-2108    Riverside, California  
RM-2103    Fort Collins, Colorado  
SE-2103    Macon, Georgia

### Lightning Fire Research (Project Skyfire)

INT-2101    Missoula, Montana

### Fuel Appraisal Systems

PNW-2103    Portland, Oregon

### National Fire Danger Rating System

PNW-2104    Portland, Oregon

### Fire Control Planning Systems

PSW-2102    Missoula, Montana

### Fire Control Methods

NOR-2101    Fairbanks, Alaska  
PSW-2106    Riverside, California  
LS-2101    St. Paul, Minnesota  
SE-2102    Macon, Georgia

## Special Projects

### Fire Damage Appraisal

CS-2102    Columbia, Missouri

### Forest Fire Science

INT-2106    Missoula, Montana  
SE-2105    Macon, Georgia

## RURAL FIRE DEFENSE AND INTER-AGENCY COOPERATION AND COORDINATION

### A. Rural Fire Defense and Cooperation with OCD

#### 1. Rural Fire Defense Project 107 - E. Ritter

The Forest Service has been endeavoring for the past several years to strengthen State Rural Fire Defense organizations through training.

In December 1963, an allotment of \$81,000 was made by Office of Civil Defense, Department of the Army, to the Forest Service for use in training. \$31,000 of this was earmarked for construction of a mobile fire simulator. The remainder was for allocation to States for Project training.

Executive Order 10998, signed by the President on February 16, 1962, ordered the Secretary of Agriculture to assume responsibility for rural fire functions --in cooperation with Federal, State, and local agencies; develop plans for a national program and direct activities relating to the prevention and control of fires in the rural areas of the United States caused by the effects of enemy attack.

The Secretary's Memorandum No. 1489, revised February 7, 1963, states the Forest Service is responsible for pre-emergency and emergency operations covering prevention and control of fires in rural areas caused by effects of enemy attack in cooperation with State Government and appropriate Federal agencies.

Fire protection of rural areas is an immense problem. The principal short-term objective of the project is aimed at training volunteer firemen and others who have indicated a desire to help in the event of an enemy attack. The extent of coverage is aimed at protection of over 500 million acres of range, agriculture, brush, and forest lands where strengthened wartime readiness is particularly needed. A large portion of the acreage is in the prairie region, yet there are comparable areas in all parts of the United States.

All Regions submitted proposals for potential projects. Those selected were representative of five different Forest Service Regions in five different States. They are Region 2 - Colorado, Region 6 - Oregon, Region 7 - Kentucky, Region 8 - Florida, and Region 9 - Missouri. This allowed an average of \$10,000 per project. A small organization and some training equipment were financed.

A group of Forest Service people met in St. Louis in February 1964 to be oriented on the program and to plan details. Following this meeting, a small task force prepared an instructor workbook and other training material. In July 1964, a training session was held at Rolla, Missouri, for Regional and State Project Leaders.

The program has been received favorably in the five States. Many requests for additional training in rural fire defense have since been received from fire companies and individuals. State men continue to explain the program. For example, a progress report from one State told of contacts with county judges, county attorneys, county civil defense directors, fire chiefs of volunteer fire departments, soil conservation service directors, and county agents.

During the first nine months since these projects were activated, more than 10,000 contacts have been made.

Project Report from Missouri - RFD Project 107 --

W. R. Tikkala

Missouri is offering Rural Fire Defense training in all parts of the State not under organized fire protection. This training is being given to fire departments and other interested groups. For the most part, our reception has been favorable. A few departments have not participated, and with some it takes time to get started. Some receiving the training are limited as to where they can take action on fires. This training is a start toward getting organized fire protection in unprotected areas. If it could be supplemented with some type of action program, Missouri will have made another step toward reaching its goal of State-wide fire protection.

2. Status of Rural Fire Defense State Plans -- Hume Frayer

An effort was made in 1956 to strengthen Rural Fire Defense. Some Civil Defense money was allocated the Forest Service to stimulate action. Most Regions received sufficient financing to employ a specialist to aid in preparation of State plans. Much help was received from many State Rural Fire Defense Committee members, especially those on the State Foresters staff.

The first State plan was completed in 1956. This was followed in 1957 by plans for 31 additional States. Eight more plans were completed in 1956, three in 1960, one in 1961, and one in 1962. Five States have failed to submit a Rural Fire Defense plan.

As of the present date, 15 State plans have been revised or rewritten to an acceptable standard. Eight State plans were up-dated in 1962, but need additional changes to bring them in line with manual requirements. Twenty-two State plans reflect no readjustments to meet requests made in 1962 and 1963.

Discussion: One possible way of getting adequate State Fire Plans is for the Forest Service to furnish the State with a skeleton outline to get them started. Forest Service representatives can also attend State fire meetings and "talk up" State Fire Plans.

### 3. National Fire Coordination Study - Project #229.-- W. R. Moore

In June 1964, the Chief of the Forest Service agreed to conduct a fire study for the Office of Civil Defense. This study is known as the National Fire Coordination Study and is sometimes referred to as Project 229. The purposes of the study are to: (1) review pertinent research and define the Nuclear Fire Problem, (2) recommend a Nationwide Fire Program, including alternatives, for the Office of Civil Defense, and (3) recommend how the several parts of the fire programs should be implemented.

The study requires preliminary analysis, and an Analytical Report. The end products of the study will be fire plans, policies, and procedures in the Civil Defense Guide and a Comprehensive Report that will be the basic reference for the Fire Program.

#### ANALYTICAL PHASE IS NEARLY DONE

##### A. Analyzing the Situation

Preliminary Studies: The first phase includes summarizing pertinent fire research, studying large fires, examining the workings and capabilities of our existing fire services and reviewing studies made in the past. These ventures provided information from which the potential Nuclear Fire Problem was defined.

##### B. The Analytical Report

A brief analytical Report was submitted to the OCD on December 15, 1964, as required in the contract. OCD asked us to expand this report, and put it in a format most useful to them. They allowed time to April 1, 1965, to do this.

#### NUCLEAR FIRE THREAT IS SIGNIFICANT

The study team has defined the potential nuclear fire threat from an operational viewpoint. For the first time, a sound basis is available for a comprehensive nationwide fire defense program. Significant parts of the Nuclear Fire Threat are described below.

##### A. Nuclear Fires Threaten Sheltered Survivors

Fire is a lesser threat to lives than blast and fallout if the population is in residences. This is because the overwhelming effects of blast and fallout leave fewer persons alive to be threatened by fire.

The fire threat is very significant for a well sheltered population. In this situation, people are alive in areas where the incidence of fire is high.

## B. Nuclear Fires Threaten Resources

Approximately 10% of the land area of the United States may be burned by rural and wildland fires if a 7000 megaton attack occurred on the United States during an average bad fire day in August. This extreme case could be worsened by employing air bursts at altitudes calculated to maximize thermal ignitions. Direct fire threat to communities, lives of people, and resources needed for recovery is involved plus indirect problems of confusion created by smoke and havoc from these large fires.

### NUCLEAR FIRE THREAT CAN BE LESSENERD

#### A. Existing Fire Control Capabilities Can be Expanded to Limit the Nuclear Fire Threat

Organized fire services in the United States have capability to achieve fire control and rescue in their localities for disasters typically experienced in peacetime. These are fire professionals with ability to act independently and effectively. Given guidance, support, and training in nuclear fire, these professionals can expand their capabilities to provide leadership to the public and take preparedness, selective fire control, and rescue actions that will reduce the nuclear fire threat significantly. Strategies and tactics used by the fire services, to be effective, must be far different from normal and will vary by communities. An understanding by public officials and the citizenry of the magnitude and complexity of the nuclear fire problem is a prerequisite to successfully reducing the fire threat. Such understanding is not widespread in the United States.

#### B. Alternative Fire Defense Programs are Being Designed

Ignition and fire spread prevention measures can reduce the incidence of fire from nuclear attack, thus minimizing the job of the Fire Services and the citizenry to remove lives, property, and resources from fire risk. Support plans are needed to implement these measures and to enhance the rescue and suppression efforts of the organized fire services. Citizen training and Nuclear Fire Leadership Training for the fire services is necessary.

Combinations of protection measures, support plans, and training are being tested by the study team in search of the most effective fire program for the Office of Civil Defense. Three programs - austere, moderate, and comprehensive - are being developed.



## CONTINUING RESEARCH AND DEVELOPMENT IS NEEDED

Analysis of the fire defense problem in the United States included a summary and interpretation, from an operational viewpoint, of pertinent research findings. These findings are the basis for the problem definitions and protection measures. Continuing research is needed to update and improve measures to limit the nuclear fire threat. The analysis thus far indicates research and development are especially needed to:

- A. Define more clearly how fires spread in urban areas.
- B. Develop equipment and field test feasibility of protection measures.
- C. Develop an effective way to classify urban fuels.
- D. Improve input data for urban and rural fire spread models.
- E. Provide more adequate data for use in protecting shelters from fire.
- F. Better identify the relationship between weapons effects and the variables of weapon yield, height of burst, atmospheric alternation, pulse shape, pulse duration, season of the year, and fuel ignition characteristics.

### Discussion:

States will look to the Federal Government for assistance. It would be helpful to have the police and fire services planning from the same basis.

## B. Inter-Agency Cooperation and Coordination

### 1. Fire Cooperation With Other Agencies - H. Coons

Cooperation and coordination of National Forest fire control with other agencies, aside from the State and Private Forestry programs, is fairly recent. Until about 1955, little attention was given to protection of Bureau of Land Management lands. There are now many agencies -- federal, State and private-- engaged in fire control activities. We must cooperate and coordinate our own fire control activities with these agencies. There is need for more formal arrangements covering our cooperative and coordinating relationships.

We have greatly improved our situation in Region 4 through an aggressive program of revising and extending our cooperative agreements. We are attempting to develop a master agreement with each agency covering the basic financial and other arrangements provided in the authorizing cooperative legislation. These agreements in turn provide for preparation of annual operating plans at the National Forest--other agency field level. This arrangement requires that field personnel sit down together and work out the details of their cooperation and coordination.

Through the development of the new master agreements and operating plans, relationships between the National Forest-Agency personnel have been greatly improved. Also the requirement for annual review and implementation provides a built-in system for keeping agreements active and up-to-date.

A look at some of the developments on the horizon indicate even more extensive and closer cooperation between National Forest fire control activities and those of other agencies.

## 2. Developments with Interior Agencies -- M. S. Lowden

### I. Congressional Interest and Inquiries

#### A. Inter-agency cooperation and coordination

1. Concern for efficiency, economies, overlap or duplication of efforts.
2. Report to Government Operation Committee three years ago reported many ways we had and would work together.

### II. History - Forest Service - Interior Agencies Cooperation

- A. Department Memorandum of Understanding  
Other agreements and cooperative efforts - local, regional, national.
- B. Interior Agencies - new authority,<sup>and</sup> expanded programs, such as BLM Multiple Use Law.

### III. Forest Service Fire Control Leadership

- A. Recognized leadership - Fire Control management and research. Rural Fire Defense Training Courses, Equipment Development, Interagency seminars.
- B. Increasing responsibilities - Rural Fire Defense - Project 229, Foreign Forestry.
- C. Forest Service must lead more. Take initiative in cooperation.

### IV. Specific Developments

- A. Closer working relations at national level. Interior agencies take part in many of our seminars and meetings.
- B. Plan for Inter-Agency Fire Control Coordination Center in West Lake Boise.
- C. West Yellowstone Air Base
- D. Fire-Weather Telemetry.

## Program Ahead

- A. Continue to foster and sponsor cooperative work.
- B. Keep each other (Washington Office and Regional Office) informed on what is going on.
- C. Possible agreement with Mexico - Interior Department, and Forest Service.

### 3. Cooperation in Air Operations -- John B. Spring

#### Problems and Solutions in Region 8

Problem #1 How do we get better understanding of our air operation procedures by agencies we work with?

Solution Primarily by: (1) Attempting to establish a partnership status rather than a big brother with money status; (2) Joint air training sessions; (3) Designating qualified State chief pilots as Forest Service inspectors of State aircraft, thereby recognizing the professional status of State personnel; (4) Evaluate problems confronting States in their air operation and when possible advise as to our solution to the same problem in the past; (5) Joint operational programs (air tanker, detection, etc.).

Problem #2 Are aircraft and pilot follow-up inspections adequate with our cooperators? What is the attitude of the cooperators in this respect? This has been a problem in the Southern Region.

Solution Designate qualified State Chief Pilots as inspectors of State aircraft for the U. S. Forest Service. Designated Chief Pilots all have current copies of FSM 5700. In some cases, State requirements on minimum hours for hiring pilots were much lower than ours. The designated Chief Pilots for these States have approved only those pilots meeting our minimums to fly on Forest Service missions. However, since the designation program was instigated, several Chief Pilots have been successful in convincing their superiors of the value of State requirements equal to ours. Prior to this program, when we broached the subject, we were told--the State could not afford to pay professional pilots enough to interest them.

Problem #3 Are aircraft and pilot follow-up inspections adequate with our cooperators?

Solution Since designating the Chief Pilots, follow-up inspection has been no problem. The Regional Air Officer visits with the Chief Pilot as often as possible (at least once a year) and is able to evaluate their progress.

We have experienced temporary setbacks caused by changes in State personnel, (elections and Chief Pilots quitting). Therefore, once the program is rolling, we can't sit back and relax, but must keep our contacts with the States current.

FINANCIAL MANAGEMENT- Chairman, A. G. Brenneis

Basically, this discussion will center around the premise that a fresh look at fire finances is in order. It is hoped that we can come up with some objective thinking that, through some change in direction, we can indirectly bring the effect of additional dollars to help redeem fire management's responsibilities to resource management. Personally, I feel certain things can be suggested to accomplish this.

As chairman, I would just like to make a few comments to "kick off" the first topic.

When we discuss "base" and "project" we're only talking about the same numbers of dollars. We are not talking about separate "bags of money."

When we talk about assessments at Regional Office level, it is necessary that we recognize that all activities must be assessed to do certain Regional activities - training centers, service divisions, photography and mapping ; just to mention a few. Maybe each Region makes these assessments differently, and the end result is probably different. The important thing for the Fire Control Division Chief to remember is to be critically aware of the assessments - and ask, "what are they for?". Are they part of long-range programs, or are they to meet a specific need "right now"? I don't feel that it's possible to go along with all proposals; it's necessary "to file a minority report" periodically and try to keep things in perspective.

A. Where our money goes.

1. National Fire Control Budget - F.Y. 1965. - M. S. Lowden

<u>WO</u>		\$1,557,800
(1) <u>Dir. Expend.</u>		
Prog. Div. (Fire Control)	\$284,100	
Serv. Div.	461,631	
Air Repl.	192,000	
Reserve	38,400	
Total	<u>\$976,131</u>	
(2) <u>Spec. Allot.</u>		
Equip. Dev.	\$371,069	
CFFP	100,000	
Impact Survey	80,000	
Joint Proj. with Res.	30,600	
Total	<u>\$581,669</u>	
<u>Region</u>		<u>\$21,667,700</u>
(1) <u>RQ</u>		
Prog. Div.	\$766,500	
Serv. Div.	\$ 591,000	
Total	<u>\$1,357,500</u>	
(2) <u>NE</u>		
SO Staff	\$1,296,700	
Adm. and Bus. Mgmt.	1,136,500	
DR and Assist.	2,734,000	
Total	<u>\$5,167,200</u>	
(3) Proj. to Regions	\$15,143,000	
<u>Qtrs Ded.</u>	-	\$ 214,500
<u>Total Approp.</u>		<u>\$23,011,000</u>

The Washington Office expects the Regions to be on the alert for suitable material for the annual fire control budget presentation. Each Region was given copies of fire control justification statement material for F.Y. '66 to give ideas as to what is needed. Before August 1 each year, the Regions can inform the Washington Office Division of Fire Control of likely ideas or material that could be used. Before doing further work in the Region, the Washington Office will make specific requests for budget material preparation. This will prevent extra work on the part of the field.

2. Pay Act increases for seasonal force. - W. J. Emerson

In each of the last three fiscal years, Congress has enacted classified grade salary legislation. Most of our seasonal fire control forces are under appointment in the classified wage category. Thus, they are entitled to the full benefits of any Pay Act legislation. Normally we do quite well in meeting the impact of increased salary costs in the fiscal year within which Pay Act legislation is enacted because we receive supplemental appropriations to cover all or a good share of the increased salary costs. However, allotments in ensuing years haven't adequately covered such costs. Example:

Sheet B R-9 Fire Control project fund allowances:

F. Y. 1962	\$655,500 )	
	)	
F. Y. 1963	689,500 )	(\$10,000 special items)
	)	
F. Y. 1964	677,000 )	(\$3,500 special items)
	)	
F. Y. 1965	707,800 )	(\$16,000 special items)

Our seasonal fire control force salaries total approximately \$415,000 annually. Thus a 5% pay increase results in an annual additional cost of \$20,750. Effective dates of the most recent Pay Act legislations:

7/5/64 (F. Y. 1965)

1/5/64 (F. Y. 1964)

10/14/62 (F. Y. 1963)

In Region 9, approximately 75% of the P&M fire control dollars, base and project funds combined, are expended for classified employee salaries and related personal benefit payments. P&M fire control allotments for the past three years have remained at about the same level. Thus the impact of having to absorb to a great extent the last three Pay Act costs is very real and noticeable.

B. Air Net and Air Base Radio Financing -- C. K. Collins

It is difficult to discuss the air net and air base radio financing without discussing the entire radio program. It is all tied together.

Radio system financing has been buried in 110 Maintenance of Improvements, and in 111 Construction of Improvements. In Region 3 and probably in all Regions, the method of financing the entire radio program has been a problem. In Region 3 90% of the program has been tied to General Administration and Fire Control. Ten percent of the cost is related to project activities, such as TSI, FR&T, brush, brush, and other. The ten percent portion is normally fully financed.

This Region, to our knowledge, has never received sufficient funds to finance the program. Until about a year ago the bulk of the deficits was paid from Fire Control funds. The argument was that most of the equipment benefits Fire Control so they should pay the bulk of the deficit.

Until about three years ago, the Forests included the deficits on their Financial Chart I. Fire Control funds were assessed for 60 to 90 percent of the deficit at that time. In the past three years the deficit was split between Administration and Fire and handled from the Regional Office. We later found that some of the budgets submitted to the R.O. did not include all the costs and Fire Control was paying the difference on the Forests.

With all the Divisions except Fire Control, project work is reduced when deficits are assessed against their funds. Fire Control's job is different so, when regular P&M funds run out and an emergency exists, they can use FFF if approved. Last year the Region assessed \$210,000 from the \$980,000 given the Region to do the fire job. This includes all assessments against Fire Control. On some some years the Region was paying from \$30,000 to \$40,000 of its Fire P&M to help finance the radio organization. Much of the work continues as normal because of availability of FFF if within the approved fire planning. Therefore, in an indirect way FFF pays the deficit especially when there are insufficient P&M fire funds to implement the approved plan.

This assessment from Fire Control for radio ceased as of F.Y. 1965. The Washington Office indicated that any deficits must be financed from 111 Construction funds, and air net communications considered in the same category as the basic radio system.

This means that, if Region 3 finances the job to be done, then the recognized radio portions of 110 and 111 funds will not begin to finance the radio system. To fully finance the deficit from 111 will mean the Region's construction program will virtually come to a halt.

Let's consider the P&M financing of Region 3's radio program for F.Y. 1965.

111 Radio Construction	-	\$ 57,000
110 Radio Maintenance (actual electronic tech. budget - P&M)		<u>152,535</u>
	TOTAL	\$209,535

Radio earned \$83,250 (25%) of the 110 funds allotted the Region (\$333,000). This plus the \$57,000 equity in 111 funds makes a total of \$140,250. The deficit was then \$69,285 which was assessed against 111 funds and the construction program was reduced by that much. At least three Forest Service dwellings were necessarily dropped from the program for F.Y. 1965. Over a 10-year period this could mean 30 dwellings. The Region is unhappy with the situation.

The above budget is not realistic. There is a 30 percent overload on radio technicians which, if financed, amounts to another \$50,000. We also have an investment of about \$700,000 in radio phones. If they are replaced every  $12\frac{1}{2}$  years, this would amount to about another \$50,000 annually for P&M's share.

It could be said that eventually the \$57,000 equity in 111 funds can be used for replacement. This may be partially right, but the Region has 283 radio units yet to purchase to complete its plan. We also find as time goes on that equipment is upgraded and becomes more costly. If the multi-channel air net becomes a reality, this will be an expensive changeover. The replacement program is already behind and will require some time to catch up to normal needs.

The Region now has 694 radio units that can be called multi-functional. There are an additional 809 that primarily benefit Fire. Of this 809, there are 108 air net sets which are restricted mainly to Fire. It could be argued that the maintenance should be financed more from Fire funds. This is hardly the case because Fire activities are limited to part of a year and technicians must keep the radios going all year for administrative use.

What should we do about this situation? Perhaps there are several approaches:

1. Has the Forest Service analyzed this situation and approached the Appropriations Committee with the facts?
2. Should we break the air net portion away from general Fire and Administration phase and finance it separately?
3. Should radio funds be clearly earmarked and not come to the Region as a part of an allotment covering a mixture of items as under 110 and 111?

Do any Regions take Land Use Funds to finance technician time on electronic special uses? This may amount to 6 - 10 percent of the technicians' time.

#### C. Cooperative Deposits For Fire Needs on Timber Sales -- Kay Housley

I. Introduction: This presentation does not come from an expert; on the contrary, it is made by one of the most inexperienced Forest Supervisors in the outfit. In presenting a few of my recurrent dilemmas, I seek sympathy less than constructive discussion. A fringe benefit may lie in the opportunity for folks from the W.O. to see what has happened to their intentions by the time these reach the forest level. The opinions I express are largely my own. This discussion is going to be provincial to R-3, but I suspect some of it will strike responsive chords in a few other Regions.



### Slash Treatment on a Typical R-3 Sale

A. Policy is no different than anywhere else -- objective is that the timber activity leave the sale area in a condition no more hazardous than existed before the sale. Heavy slash volume per MBM complicates the job. Region 3 slash policy is a strong one tied to site classes. Available dollars go to best sites first.

B. Approach in Region 3 leans heavily toward disposal as opposed to intensive protection. Reasons are: Slow rate of decomposition of heavy fuels and practicability of machine piling on most of our terrain.

#### 1. Example of slash disposal requirements on a recent sale:

- a. Machine piling and burning of 100 percent of slash on 60 percent of area.
- b. 100 percent cleanup of some areas where cleanup may or may not be required from the fire standpoint. Multiple use rears its battered head as all affected activities poke a finger into the slash disposal pie. R-3 policy says any function that wants more cleanup than the sale can justify by policy from the fire angle, then that function must pay the bill. One hardly ever sees any money to go with requests from a pre-sale appraisal and Multiple Use Report.

### III. Are we Doing Enough Slash Disposal?

A. In terms of meeting minimums, while getting the most dollars into the Treasury, the answer is a qualified "yes". I say "qualified" because most fire control people question whether or not we are really meeting minimum requirements under the policy.

This concern stems from statements like this in a typical timber sale contract, and from other moves in this direction.

B. In terms of reducing risks to a practical minimum and actually cutting down ultimate fire losses and costs, the answer is an unqualified "No."

#### 1. Policy changes at the top will be needed.

- a. Enhance rather than equalize when doing the slash treatment job.
- b. Ways and means of financing treatment on sales which will not presently pay their way for slash disposal must be found.
- c. Reduction of resulting hazard must become a part of cultural operations. For example, slash disposal should be part of pre-commercial thinning jobs.

### The Financial Dilemma

A. Force account work in slash treatment gives the fire manager some built-in flexibility that many feel has saved some major losses.

1. Machines and trained men can be productively located in the high risk and slash areas when they are needed, instantly available for attack.

B. Contracting is being forced upon us, but this is not all bad.

1. Cooperative deposits still pay for "overhead".  
 2. We often get more for our money.  
 3. But timing of work and lack of fire experience can be real disadvantages.

C. Operator-handled Slash, an apparently logical "next step" after contracting has some critical disadvantages; it deprives us substantially of:

1. Financing
2. Flexibility (season and experience)
3. Supervision (or other work by substitution)
4. Quality (in some cases)

D.

1. If we must go the "operator route" then deposits are needed for on-the-ground supervision as a minimum.

2. Depending upon operator desires, ceilings and economics, we should attempt to do a maximum of our slash work by force account or contracting; otherwise we are hit in the pocketbook, and in the effectiveness of the fire job.

### V. Summary

A. Other activities are increasingly interested in the slash disposal job, making demands for modifications which can often be rationalized from the fire control, if not the Timber Management, standpoint and thus required with no additional financing.

B. It appears to be time to step up from "equalization" (if that's what we have now) to "enhancement"; policy changes are needed to make this financially possible.

C. "Operator Slash" is going to cost us in terms of financing, flexibility and sacrifice of other work unless certain modifications can be made in present practice.

D. Funds in Ranger District Managerial Account. - Merrill Tester

Fire Control funds are broken down in two ways: (1) Managerial, and (2) Project. The Managerial portion is called Ranger District Managerial Account. The Managerial Account includes base funds and some Project-Managerial. In Region 1, project managerial from seasonal force funds are normally included in RDMA. This finances the Fire Control Officer in Region 1.

The interest in what is happening to Fire Funds was stimulated by the WO analysis of drift in Fire Control funds to other activities. Our objective was to determine FC Funds, Planned Work, and actual work in RDMA. FC equity in RDMA consists of share of Base Funds and project managerial funds. It was easy to determine time worked. RDMA group charges time as worked on time records. We ran time records through ADP and determined RDMA hours worked in FC for each Ranger District.

The next step was to determine RDMA hours planned at each Ranger District. Two forms show RDMA: 1300-3 Annual Plan of Work, and 1300-5 Ranger District Financial Summary.

Available or financed hours were more difficult. All 1300-5's were not the same. In most cases we were able to get information on FC dollars from 1300-5. It showed FCO dollars and FC share of P&M base. (FC share of P&M base determined on basis of correlated workload standards.) FC dollars were then converted to financed hours by dividing them by the RDMA average hourly rate. This rate included salary, travel, and G.A.

Our particular interest was in the comparison of financed vs. worked. Comparison of planned vs. worked was also interesting. The differences usually end up in some other functional account. The results could indicate one of two things - either

1. FC job is over-financed, or
2. Work not planned or done to standard.

The Region is now working on stricter controls on number of people in RDMA. Trying to put RDMA group in a Suspense Account - like Supervisor - would preclude use of project funds.

How Other Regions Can Do

1. Determine FC funds that go into RDMA.
  - a. Can estimate FC portion of P&M base by splitting on basis of functional hours in correlated workload - FSM 1320.
  - b. Project managerial funds may be more difficult. May have to obtain through inspection on district.

2. Convert FC funds in RDMA to available hours.
  - a. Establish average hourly RDMA rate. This should include travel and GA.
3. Determine planned RDMA hours from 1300-5 or 1300-3.
4. Obtain actual worked hours by ADP of time records.

#### Discussion

GA is overcharged in many cases. Concerned about drift in P&M base because of FFF limitations. Have to chase dollars to find trouble spots. Then more follow-up, targets, and inspections. Hard to tie down the jobs in work planning because of vague descriptions. An analysis of this type is no better than the records we keep.

\* \* \* \* \*

#### E. Ways to Save FFF. - M. S. Lowden

General Objective: To Reduce FFF expenditures whenever possible and still accomplish other fire objectives. To be sure each man realizes and understands his responsibility in this regard.

#### Specific ways of doing:

1. Tighten FF 101 manning.
  - a. Careful attention to manning guides.
  - b. Watch new rangers and others that may have "fear" complex.
  - c. RO check Forests closely.
2. Maintain FFF expenditure records.
  - a. R-6 doing by Forests each month - need to correlate by weather or burning index, if possible.
  - b. Forests to check on districts.
3. Control air tanker use.
  - a. Regional air tanker use guides in all Regions.
  - b. Forests and district guides for tanker use.
  - c. Set limits on who can order or dispatch.
  - d. Provide local training - use results of evaluation study.

4. Check food costs.
  - a. Watch waste - bread and sandwiches along a fire trail - spoilage important.
  - b. Review fancy items - reduce to essential good food.
  - c. Give attention to lining up cooks ahead and give them some supervision.
5. Use tractor time effectively.
  - a. Select and arrange for best type.
  - b. Keep close time.
  - c. Watch use - don't have standing by when not needed.
6. Analyze fire costs currently.
  - a. Get your administrative officers and staff involved.
  - b. Make this a part of every fire analysis.
  - c. Watch big items and see where you can make savings.
7. Use our F.S. crews.
  - a. Many Regions use smokejumpers as regular fire crews.
  - b. Be sure all available F.S. are used before we get outside crews or pickups.
  - c. Make maximum use of Job Corps and other work crews.
8. Hire vehicles needed.
  - a. Frequently see many cars surplus to needs.
  - b. Plan, schedule, arrange for maximum use.
9. Watch long hours.
  - a. A job of all overhead - the "buck" stops with you.
  - b. We find many 16-24 hour days worked in analyses.
  - c. 12 hours should be limit - men not effective after that.
  - d. Overhead should set example.
10. Use night work judiciously.
  - a. Usually ineffective, especially in mopup.
  - b. Requires close supervision.
  - c. Keep crews small.
11. Every man a "Watch Dog"
  - a. This is every fireman's job.
  - b. Fire's part of the management improvement job.
  - c. Can overcome present thoughts of some that fire is inefficient and inconsiderate of costs.

## FIRE TRAINING DEVELOPMENTS

### A. Simulators - Archer Smith

The capabilities of the latest in the Simulator family, a portable unit with special screening for use in any room, was demonstrated. Problems of holding down on "extras" in order to preserve portability were discussed as were some of the major advantages of the unit. Advantages include: Compactness of consoles, operability, latitude for variations in simulations, scene storage and transfer, use of 35 mm slides, wider range of communications nets. (4 radio, 2 telephone). Simulator instructor prerequisites and qualification will continue along previous guides and will take 40 hours of intensive training plus extended practice.

### B. What Edex can do for us. - John Pierovich

A new training system, trade name EDEX, will be explored for applications for fire training. With this equipment, it is possible to program pre-taped lectures with automatic aids presentations, including motion picture clips. The most important feature is, however, that coincident with the lecture and aids programming, provision is made for all trainees to respond. Trainee feedback, not just from individuals but from the entire group, is recorded. The progress of the class, or of individuals, may thus be used as a gauge for special reinforcement or even modification of programs.

It is planned to purchase this equipment this spring and to begin a program-preparation project. The first phase of this project will result in programs to be tried out in the Regions and at National schools. Ultimately it is expected that each Region will want to utilize their own equipment for expanded use in all functions.

### C. Progress in Programed Texts, Films and Other - John Pierovich

The text, "Introduction to the Fundamentals of Fire Behavior" has gone to the Superintendent of Documents for reprinting. (8,000 texts and 22,000 answer separates). So many orders were received for texts and answer separates that it was impractical for us to handle publication distribution. The Superintendent of Documents will carry a continuing supply following distribution of our initial reprint order.

The Ten Standard Orders Programed Text is just returned from the contractor as camera-ready copy, and a printing order based upon the demand for the previous "best seller" will be prepared. This new text has been field tested and has been found capable of training mid-high school drop-outs in both the orders and their applications.

Arcadia Equipment Development Center's Spark Arrester film has been given a slightly revised format and reissued (with copies to each Region) as a Fire Training film. Next film in the series is being produced under the working title "Fire Versus Fire." Field shooting is completed, script revisions and sound stage work are scheduled for late April.